DOCUMENT RESUME

ED 423 158 SO 028 481

AUTHOR Powney, Janet
TITLE Gender and Attainment: A Review.
INSTITUTION Scottish Council for Research in Education, Edinburgh.
REPORT NO SCRE-RR-81
ISBN ISBN-1-86003-031-9
PUB DATE 1996-00-00
NOTE 118p.
AVAILABLE FROM Scottish Council for Research in Education, 15 St. John Street, Edinburgh, EH8 8JR Scotland.
PUB TYPE Reports - Descriptive (141)
EDRS PRICE EDRS Price MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Academic Achievement; *Access to Education; Comparative Education; *Educational Attainment; Educational Status Comparison; Elementary Secondary Education; Females; Foreign Countries; Higher Education; Multicultural Education; Sex Discrimination; *Womens Education; *Womens Studies
IDENTIFIERS Scotland

ABSTRACT

This report covers studies and statistics that provide information about the attainment of Scottish boys and girls by the time they leave school. The report considers their performance in public examinations, differences in attainment between boys and girls in primary and earlier secondary school, and differential staying on rates and uptake of opportunities in further and higher education with particular reference to Scotland from 1985-95. The review concerns equality of outcome in terms of groups performance in examinations but also addresses issues of equity and factors contributing to gender differences in outcomes. These factors include equality of formal and actual access to educational resources and opportunities and experiences that promote educational achievement. The suggestions for action which conclude the report concentrate on monitoring the effects of policies and practices on the attainment of boys and girls. The report is divided into three sections with 15 chapters. Section 1, "The Relative Performance of Boys and Girls in Public Examinations," includes: (1) "Introduction and Context"; (2) "Entry and Performance in Standard Grade and GCSE"; (3) "Staying on Rates and Higher Grade Entrants"; (4) "Results at Higher Grade and Advanced Level"; (5) "School Leaving Age and Qualifications"; (6) "Entrants to Further Education (FE) and Higher Education (HE)"; (7) "Gender and Performance at School"; and (8) "Gender and Achievement in the UK and Other Countries." Section 2, "Explanations of Gender Differences," contains: (1) "Assessment Issues"; (2) "Biological Explanations"; and (3) "Environmental Theories." Section 3, "Continuing Issues of Concern in Relation to Gender and Attainment," offers: (1) "Context for the Future"; (2) "Monitoring Policies, Practices and Outcomes"; (3) "Factors Which Contribute to Gender Differences in Attainment"; and (4) "Summary of Topics for Action and Inquiry." (EH)

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Gender and Attainment

A Review

Janet Powney

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Gender and Attainment

A Review

Janet Powney

The Scottish Council for
Research in Education

SCRE Research Report No 81

ISBN 1 86 003 031 9

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First published December 1996

This report arises from a review commissioned by the Scottish Office Education and Industry Department. It was completed in April 1996.

The views expressed are those of the authors and are not necessarily those of the Scottish Council for Research in Education or the Scottish Office Education and Industry Department.

Printed and bound by the Scottish Council for Research in Education, 15 St John Street, Edinburgh EH8 8JR.

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Acknowledgements

I am indebted to colleagues at SCRE, in the Research and Intelligence Unit of SOEID and in other organisations in Scotland and the rest of the UK for their suggestions and constructive comments on earlier drafts of this review.

Summary

This review was prepared for the Scottish Office Industry and Education Department and covers studies and statistics which provide information about the attainment of boys and girls by the time they leave school. It considers their performance in public examinations, differences in attainment between boys and girls in primary and earlier secondary school and differential staying on rates and uptake of opportunities in further and higher education with particular reference to Scotland from 1985 - 95.

The review concerns equality of outcome in terms of group performance in examinations but also addresses issues of equity and factors contributing to gender differences in outcomes. These include equality of formal and actual access to educational resources and opportunities and experiences which promote educational achievement.

Future action on gender

The suggestions for action which conclude the report concentrate on monitoring the effects of policies and practices on the attainment of boys and girls. In order to demonstrate whether or not the current gender differences reported in the review are sustained, systematically collected evidence is essential. Gender-related information should be collected by a number of parties.

- *Schools* can collect gender data in annual audits in terms of provision, entry and attainment across the full range of the curriculum. Attention to teacher and parental expectations of boys and girls from different social and cultural backgrounds could also be a profitable element in school development plans.
- *Initial and in-service teacher educators* should monitor how students are required to examine their own and others' expectations and assessment of boys and girls. Attention should also be paid to how male and female students in school, FE and HE might approach learning tasks differently.
- *Those involved in quality assurance and inspection* at all levels must ensure that access, provision and assessment are fair in terms of gender. Gender-related effects of recent government policies (for example 5-14 and the proposed Higher Still) should be monitored and vocational examination systems be reviewed for gender bias (for example in terms of assessors or items of assessment).
- *Employers* and others concerned with work experience and apprenticeship schemes should monitor the take-up of opportunities and review how any gender inequalities could be reduced.

Up-to-date information collected through these monitoring procedures should provide a firm foundation for future policies aimed at reducing inequities.

The fairly detailed summary of issues below follows the structure of the report which is organised in three sections: the relative performance of boys and girls in public examinations and access to further and higher education; themes and theories pertinent to gender differences; and continuing issues of concern in relation to gender and attainment. Pertinent statistics of gender and attainment as well as secondary sources have been used. The report ends with references referred to in the main text as well as a bibliography of other relevant sources.

Section One

The relative performance of boys and girls in public examinations

1 Introduction and context

There is relatively little research about gender and attainment in Scotland and such as there is focuses largely on girls' perceived under achievement and is restricted primarily to English, mathematics and science.

2 Entry and performance in Standard Grade and GCSE

- There are similar patterns of entry and attainment for Standard Grade in Scotland and GCSE in the rest of the UK. Girls take slightly more Standard Grade and GCSE subjects than boys and on average attain a slightly better grade with girls' performance steadily improving over boys'.
- There are distinct gender differences in the subjects taken: just over a quarter of physics entrants are girls and the same proportion of boys take biology in GCSE. This is comparable with Standard Grade entrants in Scotland.
- Girls do particularly well in language and communication, and creative subjects; boys only do consistently better in one subject, physical education at Standard Grade.
- More boys are now studying modern languages than did, but over the period 1991-95, girls' performance has improved relative to boys in all modern languages at Standard Grade.
- Regardless of overall grade, there are gender differences within elements of subjects; girls usually do well on internally assessed elements; boys' grades were more variable than girls in some elements such as problem solving in science.
- Factors contributing to performance in GCSE include course work components and the mode of examination, the kind of school attended and ethnic origin.
- In Northern Ireland, the difference in relative performance in GCSEs is decreasing except in English where boys' performance relative to girls' is declining.

3 Staying on rates and Higher Grade entrants

- Participation in post compulsory education varies according to young people's educational attainment, gender and social class but there is a trend over the last ten years for more young people to stay on at school or participate in other forms of education and training after compulsory school age.
- Girls make up slightly higher proportions of those who stay on and enter for Higher Grades and A-levels.
- Higher proportions of girls and boys continue to take A-level English and A-level mathematics respectively.

4 Results at Higher grade and Advanced level

- In terms of performance at Higher Grade and A-level, girls comprised slightly more than half the Higher Grade entries in 1994 than boys and achieved slightly better grades on average overall.
- Girls performance relative to boys continues to improve in Higher Grade, with girls' relative performance in mathematics being better than boys for the first time in 1995.

- At the highest attainment levels in Scotland, four per cent more of girls than of boys left with five or more Higher Grades. In 1994-95 this difference increased to five per cent.
- In contrast to Scottish pupils, girls in England, Wales and Northern Ireland do not retain the superior performance in A-levels, compared with boys demonstrated in GCSE. More girls stay on and take more A-levels than boys but boys achieve higher grades overall at A-level in England and Wales.

5 School leaving age and qualifications

- Over the period, 1984-1994 across the UK more pupils stayed on after compulsory school age and the probability increased of girls staying on longer at school and leaving school with better qualifications than boys in 1993-94.
- Especially among the least qualified pupils, a range of socio-economic factors could be increasing pupils' motivation to stay on longer at school: low employment prospects, reductions in long term apprenticeships and changes in financial support for young people are some of these factors.
- In Scotland, there continue to be gender differences in the uptake of various subjects with girls presenting for more educational awards - including vocational qualifications - than boys.
- Across the UK as a whole, there has been an increase in the number of school leavers with an educational qualification. In Scotland, girls attain more advanced qualifications and, compared with boys, fewer leave without any academic or vocational qualifications.
- There is more variability in Northern Ireland where pupils gain more A-levels than anywhere else in the UK but where also girls outperform boys at all examination levels and there are more boys leaving without any educational qualification.

6 Entrants to Further and Higher Education

- More girls than boys continued their education after leaving school and more boys went into full time jobs or took up apprenticeship opportunities likely to lead to further vocational qualifications.
- The level of parents' own education is one of the most important factors affecting staying on rates and take up of higher education among students of similar achievement.
- The numbers of students in higher education has increased dramatically over the ten year period reported in the Scottish Office statistics (1995) and the proportion of men and women in FE and HE has changed considerably. In 1993-94 women comprised more than 48% of full-time and more than 43% of part-time entrants to higher education. The most dramatic increase has been in the percentage of part-time entrants to further education colleges who are women..
- Nevertheless, proportionally fewer well qualified girls than boys are entering higher education in Scotland.
- Little data is available on ethnic origin and the relative entrance rates and achievement of young men and women from minority ethnic groups in F/HE in Scotland.
- The implementation of government initiatives to improve standards of education and training for young people is making better progress in Scotland than elsewhere in the UK. Nevertheless it is unlikely that 70% of young people will attain SVQ Level III or three Higher Grades (or equivalent) by the target date, year 2000.

7 Gender and performance at school

- Longitudinal studies show that school leavers' achievement in public examinations generally reflects the progress of pupils through their school career in the core subjects of English language, mathematics and science, with girls gradually pulling ahead to outperform boys at the age of 16.
- There are gender differences in specific tasks in maths and science. Differences between boys and girls may be due to a wide range of factors to do with experiences, the nature of a task and its assessment.
- There is some evidence in the UK as a whole that teachers may be underestimating the abilities of children from minority ethnic groups or whose first language is not English.
- Monitoring reports do not consistently refer to any gender differences and gender has declined as an explicit issue in monitoring pupils' progress.

8 Are the relationships between gender and achievement in the UK comparable with other countries?

- Definitions and assessment are so culturally bound that it is difficult to make direct international comparisons even in the relative achievement of boys and girls.
- International studies confirm that girls across the world outperform boys in language throughout their school career, boys are better in sciences overall and by the time they leave school, boys outperform girls in mathematics.
- There are differences in subtests and in some cases these may reflect girls' more tentative approach to tackling problems and guessing.
- Research suggests complex relationships between gender, race and achievement
- Legislation facilitates equal opportunities but does not guarantee implementation of all appropriate action.

Section Two

Explanations of gender differences

9 Assessment issues

- There are major problems in making comparison of examination results over time due to the changing nature of the test population and what is being assessed
- Fruitful areas for further research are likely to be in potential bias in tests and among the choice of assessors and the criteria they use especially in relation to vocational qualifications.
- Boys and girls vary in their approach to assessment tasks and in their performance in course work and examinations. Their previous learning experiences and self confidence are likely to be important factors.

10 Biological explanations

- Biological explanations for gender differences in attainment are deemed unprofitable until there is confidence that all environmental benefits have been maximised for boys and girls in all ethnic and socio-economic groups.

11 Environmental theories

- Rather than a single factor, it is the cumulative disadvantage accrued from a complex interaction of social and educational factors which affects a pupil's

uptake and success in educational opportunities but it is not clear how boys and girls are influenced differently.

- Parental and other adult role models do not similarly affect the attainment of boys and girls of all ethnic groups and classes.
- Schools make more impact on girls' than on boys' attainment in subjects and skills learned primarily at school. Teachers' expectations and interactions with boys and girls affect how pupils develop a gendered view of subjects even from an early age.
- Evidence suggests that in the UK as a whole: boys from mixed schools are more successful that girls from mixed schools; and girls from single sex schools did better than peers in mixed schools.
- Gender differences persist at all levels of education with females reluctant to participate in computer studies and males in modern languages. Despite a range of initiatives, girls are still under-represented in engineering courses in higher education.
- Policy makers have primary responsibility to ensure that issues of equality and justice are taken into account in developing and implementing policy related to curriculum, resources, staffing, and the preparation and professional development of teachers.

Section Three

Continuing issues of concern in relation to gender and attainment

The final chapters of the report provide a synthesis of the emerging issues in the context of all sectors of education promoting equal opportunities policies.

- The key areas for action relate primarily to monitoring policies, practices and outcomes to remedy the current absence of systematically collected evidence to underpin policy and action on gender differences in relation to many areas of Scottish education.
- Factors which merit more attention include the circumstances of assessment, the social context and differences related to gender in learning styles and methods of teaching access all areas of the curriculum.

  The relative take-up and performances by young men and women in further education is a neglected area of study.
- The relationship between gender and attainment persists as an educational issue. There is a continuing need for sound evidence gathered through a variety of methods and over different time scales about gender equality and persisting inequality in Scottish education.

SECTION ONE

The relative performance of boys and girls in public examinations

Introduction and context

> A predominant belief about schooling is that it is one of the best and most accessible mechanisms to achieve social mobility. Implied in this belief are the assumptions that education provides people with knowledge and skills on an equal basis; that the level of education people obtain depends primarily, if not solely, on their intellectual abilities; and that equal levels of education produce equal levels of pay, reward and prestige. However it has been observed that there are differences in the inputs and outcome of education and that these differences, far from being randomly distributed, seem to negatively and persistently affect certain populations: mostly the rural, the poor, the racial minorities and women – all groups with limited political power.
>
> Stromquist (1989)

This review is concerned with the attainment of boys and girls by the time they leave school. It considers their performance in public examinations, differences in attainment between boys and girls in primary and earlier secondary school and differential staying on rates and uptake of opportunities in further and higher education with particular reference to Scotland. The relationship between achievement and gender is complex and also has to take account of social class and ethnicity. This review focuses on gender but keeps social class and ethnicity within its peripheral vision. It is also concerned with examination performance at the end of a school career and uptake of further and higher education but these cannot be dealt with soundly without some reference to the expectations and access to subject studies experienced throughout a young person's school career.

This introductory section provides the context for concern about the relative performance of boys and girls and describes how this review was conducted. I then move on in Section One to the question, 'What is the relative performance of boys and girls in public examinations?' In a series of short chapters, data is summarised on the relative performance of pupils at 16 (Standard Grade and 'O' level), and the relative numbers continuing their education after compulsory school age. The following chapters focus on the public examinations which qualify young people for entry to higher education (Higher Grade and A-levels), vocational qualifications (National Certificate) and male/female differences in qualifications on leaving school and entrants to further and higher education. The final chapters in the descriptive section of the review compare the outcomes of public examinations in the UK with gender differences in other countries and also with young people's earlier attainments at school.

The second section of the report considers, 'What themes and theories recur in explanations of gender differences?'. I focus in turn on factors concerned with the assessment processes, biological explanations and a longer discussion of environmental factors.

The final section of the review addresses the question, 'What are the continuing issues of concern in relation to gender and attainment? 'and makes some suggestion on questions to be addressed in future research.

1.1 Why is there a concern about the relative performance of boys and girls?

The attainment of boys and girls at school has to be seen in the context of equal opportunities movements especially over the last fifty years. At the beginning of the second world war, it had become clear that men's standards of literacy and numeracy were lower than expected. To counteract the waste of talent and to enable people to contribute more effectively to society and to the war effort, the armed services provided extensive educational support – so much so that many men who survived the war were able to extend their education and training beyond the previous expectations of their social class. Class differences in access to further and higher education gradually began to be eroded – though by no means completely. However it was much slower for women than for men as post war pressures encouraged women to return to home and family, relinquishing their war time responsibilities and jobs. Men had priority for jobs and associated education and training.

Balanced against the different employment prospects for men and women in the 1940s and '50s were the 1944 Education Acts, covering all parts of the UK, which opened secondary education to all those who passed the selection test (the eleven plus) regardless of income or sex. Despite this move towards equality of access, it became noticeable that girls did not achieve as well in certain subjects and, even if they did attain good exam results, were not necessarily progressing to higher education at the same rate as boys. These differentials led to questioning whether there was real equality of opportunity endorsed by:

- styles of teaching and option choices in schools
- in the tests themselves or their marking and administration
- and in the correlation between examination results and progression into further and higher education.

For girls still at school, there were the increased opportunities resulting from the 1944 Act but changes were necessarily slow given that the staff themselves were trained at a time when inequalities were endemic in society – for example until 1944 women could not continue as teachers if they married. These teachers were providing not only education but also role models and careers advice for their pupils. It is difficult now to appreciate how narrow, in the fifties and sixties, was the normal range of career choices (secretary, nurse, teacher) that schools advised girls about compared with the much more open range suggested to boys. Even this narrow range of career choices was based on the assumption that student nurses or teachers would not marry during their training. It was only the shortage of sufficient qualified teachers to cope with the post war baby boom that led to the rapid expansion of teacher training in the sixties (entrants to courses of initial teacher education doubled in number from 1960 to 1972 since when they have declined) and male and female mature students were encouraged to become qualified teachers – even if they were married. It is interesting to speculate on the influence of mothers who had been very active in the war and who had broken (albeit temporarily) established codes of what women could and could not do. As Bamford (1988) says, women's opportunities were deliberately limited because they have always been identified as having future domestic responsibilities which (it was assumed) precluded them from also having paid employment. However the daughters of these women were those who pushed different forms of feminism forward in the UK and excited new interests in equality of opportunity in terms of gender.

In Scotland, there have always been more women than men involved in teaching but examination of their responsibilities and status shows clearly that men have dominated the profession even in primary schools where even now they hold a disproportionate number of promoted posts (Fewell 1990, Powney 1994). As the age of students increases so the proportion of women in teaching posts of responsibility decreases. In 1993 there were no women principals of further education in Scotland, no women on the newly established employers' association and only four women elected as Chairs of the new Boards of Management out of a total of 43 colleges (EIS Press release 6.1.93).

The formal recognition of the disadvantaged position of girls and women in education came in the Sex Discrimination Act of 1975 which had equivalents in Scotland and Northern Ireland. The Government White Paper preceding this Act provided statistical evidence of an educational system highly segregated by gender, and from which girls and women were less likely to emerge with formal qualifications (Montgomery 1994). Girls and women were particularly under-represented in Science and Technology.

Since the Sex Discrimination Act, there has been considerable research in the field of gender and education mostly focused on the disadvantages experienced by girls and women. However, in Scotland, despite legislation and evidence of gender inequality, there has been little educational research activity concerned with gender. Brown (1993 and Turner, Riddell and Brown 1995) describe most of the writing on gender as 'monitoring bleakness' with very little research focusing on gender issues. Such research as has occurred has largely focused on girls relative under-achievement and only recently has renewed interest in gender inequality emerged from a different concern – the apparent under-achievement of boys as the relative performance of girls in public examinations has improved over the years. Paterson and Fewell (1990) are among those who recognise a major obstacle to gender research in the myth of equality built into the system:

> The proud Scottish tradition of education which embodies the belief that talent is the key to educational (and implicitly social) mobility, provided an apparently sufficient account of the structure and content of educational provision.

They claim that any effort invested in tackling the myth has focused on social and economic power relations rather than on inequalities associated with gender or race. It is difficult to separate these dimensions since there are certainly correlations between gender, class and ethnicity all of which are tied into socio-economic status.

■ 1.2 Definitions and ideologies

Gipps and Murphy (1994) trace developments in equal opportunities policies and assessment over the last fifty years. The 1944 Education Act was based on assumed innate differences in abilities, intelligence and aptitudes which could best be served by different educational settings – grammar school, technical school (largely for boys), and secondary modern school. The emphasis was on making education accessible for all regardless of circumstances. Halsey (Halsey *et al* 1980) shifted the emphasis to equality of outcome in recognition in the 1960s that opportunities were not equally accessible and taken up. Halsey was educational adviser to the government in formulating comprehensive education doctrine which he now admits was based on stereotypical expectations of boys and girls. As he put it in a recent radio interview, he did not believe that girls were brighter than boys but were more likely to 'carry the moral banner' and have a civilising effect on boys. Halsey moved the focus from equality of opportunity to equality of outcome. Equality of outcome underpins discussions of group (not individual)

performance in public examinations and, as mentioned earlier, while equality of opportunity and educational outcome may be discussed in relation to social class, gender or ethnicity, it is the combination of these factors which has to be taken into account. The pace of change has been gallingly slow for some commentators. Andrew McPherson, sets out the vision:

> When we talk about gender equalisation in secondary-school attainment, we mean more than a trend towards equality. We mean absolute equality.
>
> (McPherson 1989)

A stronger critique of models based on inherent characteristics or a deficit model (let girls have the chance to catch up) emerged from reconsideration of what it means to be successful. This resulted in an anti-sexist perspective (paralleled in anti-racist perspectives) which, as Weiner (1990) suggests, challenges:

> the unequal power relations between the sexes and ethnic groups and aim to transform the patriarchal and ethnocentric nature of school structures and curricula.
>
> (Gipps and Murphy op.cit., p10)

At one level, this was endorsed by the Equal Opportunities Commission (EOC). In 1991, an EOC leaflet 'Equal Opportunities in Schools' openly addressed issues such as:

- teachers' differential expectations of girls and boys
- the amount of teacher attention and use of resources
- and verbal and physical harassment of girls by boys.

Others (eg Yates 1985; Thelin 1990) also emphasised that equality of resources and formal access to curricula cannot be sufficient if criteria for success are still defined in terms of the dominant male group without revising the agenda for jobs, power, authority, family life and child care to meet the actual needs of girls and women. As Gipps and Murphy (op.cit p.10) put it, the interests, strategies and plans of girls and young women should be as important as those of their male peers. This view is reinforced by Elwood (1995):

> In considering what we mean by equity in relation to examinations, we must acknowledge that teaching, learning and assessing/examining are gendered processes and that we need to actively review the systems that we have in place for examining students with this in mind.
>
> (Elwood 1995, p3)

The team at the Institute of Education, London, also questions whether similar performances should be expected from males and females in examinations (Stobart *et al.* 1992). One of the assumptions behind gender research is concerned with issues of inequality arising from presumed differences and socially constructed notions and stereotypes pertaining to different groups- men and women, boys and girls. Research to do with inequality is therefore to do with social justice. Powney (1994) and Weiner (1995) question whether it is helpful to identify difference in order to increase educational quality since inequalities in education reflect inequalities in society; education alone cannot achieve social equality.

The discourse thus moves on to equity definitions concerned with social justice. Secada (1989) had distinguished between equity and equality:

> Educational equity should be construed as a check on the justice of specific actions that are carried out within the educational arena and the arrangements that result from those actions. Equality is defined implicitly as the absence of differences (between groups).
>
> Secada p69

Equality studies are concerned with quantitative differences between groups. The dimensions they do not address are the qualitative issues related to the curriculum against which that equality is assessed (Gipps & Murphy *op cit* p. 13). Examples of national policies concentrating on equality were those looking at compensatory education or minority groups rather than individual rights and freedoms.

This review concerns equality of outcome in terms of group performance in examinations but also addresses issues of equity and factors contributing to gender differences in outcomes. These include equality of formal and actual access to educational resources and opportunities and experiences which promote educational achievement. Coleman (1966) suggested that equality of output is determined not just by the resources available but by how schools and other educational institutions use those resources effectively given the diverse influences in bringing about students' achievement.

1.3 Tackling this review

There is a vast amount of material on gender and attainment in the national and international literature, and in the relatively brief time available for this review it has not been possible to cover all relevant sources. Rather than depend solely on secondary accounts of the present situation in Scotland, I have presented pertinent tables on gender and attainment and looked at summaries of original evidence such as the surveys in the Assessment of Achievement Programme (AAP). These demonstrate the extent to which gender has or has not been an issue for analysis, comment and discussion.

Books and articles consulted are listed in the references; those referred to in this text but not consulted personally are listed in the bibliography which also includes a few other potential sources not mentioned in the text.

I found it helpful to start with Gipps and Murphy (1994) as a key text to weave through the history of gender and attainment. This provides an excellent overview of testing and gender including national and international surveys. It suggests using three possible hypotheses to explain gender differences: biological, cultural, environmental factors. However, this does not focus on the Scottish situation where the Assessment of Achievement Programme (AAP) and Scottish School Leavers Surveys (SSLS) provide longitudinal perspectives. Key texts for Scotland are in Bamford (1988), Paterson and Fewell (1990), which supplies useful background of Scottish educational experience, Brown and Riddell (1994) as well as the latest publication on gender to come from the team at Stirling University, Turner, Riddell and Brown (1995).

Any review which includes a longitudinal dimension has problems of validity. This review is an account of gender and attainment in the context of the mid-1990s that is after the development of substantive concern about girls and feminism, and at a time when boys might be considered as under achieving. It should be viewed in the context of changing patterns of :

- family structure and organisation
- employment for young people and adults
- apprenticeships and training opportunities
- financial support for young people
- leisure interests and activities.

All of these could be contributing to the steady increases over the last five or six years in the numbers of young people continuing in full time education after the compulsory school age (Lynn 1995). Any comparisons of documented gender differences in attainment between cohorts of pupils over the last ten years have to take these factors into account. Their impact on boys and girls may be quite different or both sexes may be similarly affected. For example, girls have had less access to training opportunities from full time employment although financial changes introduced for income support for young people affect boys and girls alike.

Two other difficulties mentioned by Gipps and Murphy (1994) and associated with making comparisons over time are worth signalling here. One concerns the aspect of the curriculum which is being assessed and how. For example, investigative maths and the processes of science were not substantive elements in secondary teachers' practice at the beginning of the surveys carried out by the Assessment of Performance Unit (APU) in England and Wales although science processes were being actively debated. Oracy was only introduced into the APU language assessments from 1982. Designers of standardised tests are familiar with the difficulty for example of equating language used at one period of time with that relevant and meaningful some years later when vocabulary and usage have moved on.

Another important difficulty in longitudinal work is that the focus of interest for the researchers or those who commission the inquiry may change. The Assessment of Performance Unit identified gender differences but the political climate of the time did not support records of ethnic differences. As I show later, AAP work in Scotland has not been consistent in reporting gender differences (or their absence) and there is an absence of data concerned with ethnic monitoring although there are indigenous minority ethnic and linguistic cultures (eg Gaelic) as well as substantial populations of families immigrating to Scotland during the last fifty years.

Despite these disadvantages, it is possible to identify some trends in gender and attainment at school and in the take up of further and higher education.

1.4 Current qualifications and curriculum for school leavers in Scotland and the rest of the UK

For the benefit of any readers unfamiliar with the Scottish secondary system or wanting to compare it with the rest of the UK, a summary of the key features of the assessment schemes for school leavers is provided below. It is largely taken from the Scottish Office guide for employers: *School Leavers Qualifications in Scotland* (1988).

Standard Grade

Since 1984, the Scottish Examination Board Scottish Certificate of Education (SCE) Standard Grade has been replacing Ordinary Grade as the normal qualification obtained

(or at least taken) by all pupils in the fourth year of secondary school. An award at grade 3 (or C) at Ordinary Grade was the roughly the equivalent to a pass on the former General Certificate of Education (GCE) Ordinary Level available at the same time in the rest of the UK and to the Certificate of Secondary Education (CSE) grade 1.

Standard Grade was designed to modernise the curriculum in the third and four years of secondary education and to cater for the whole range of pupils' abilities. The courses stress applications of knowledge and important skills for adult and working life. There is a mixture of school-based and external assessment with nationally agreed standards set for the three broad levels of attainment within each subject:

	Point on scale	
Credit	1} 2}	Most demanding level
General	3} 4}	Intermediate level
Foundation	5} 6}	Mastery of basic skills and knowledge
Course completed	7	

At Standard Grade there is an overall grade for each subject and a 'profile of performance' in the different parts. English, for example, is broken down into Reading, Writing, and Talking (and until 1988, Listening also).

Standard Grade awards are criterion referenced using grade related criteria. They are not strictly comparable to Ordinary Grade awards because they cover aspects of subjects not previously examined and are arrived at using a wider range of assessment techniques. As a guide, awards at grade 3 on the Standard and Ordinary Grades are approximately equivalent. Grade 1 at Standard Grade is however more demanding than at Ordinary Grade. Standard Grade is broadly equivalent to the General Certificate of Secondary Education (GCSE) awarded elsewhere in the UK.

Higher Grade

The Scottish Examination Board Scottish Certificate of Education (SCE) Higher Grade has long been established (since 1888) as the major school qualification taken in the fifth or sixth year of secondary school. Highers are the normal entry requirement for degree and professional courses at colleges and universities in Scotland and are accepted by some universities out with Scotland. Four bands are awarded on the basis of marks scored in national examinations. Bands A-C are designated passes. Higher Grade is intermediate between GCSE and GCE A Level on a subject basis.

The Certificate of Sixth Year Studies (CSYS)

A pass at Higher Grade is a pre-requisite for entry into each CSYS subject which provides work similar to that in the initial stages of degree course at colleges and universities. The standard of CSYS is more demanding and different in approach compared with GCE A Level.

The National Certificate

The National Certificate of the Scottish Vocational Educational Council (SCOTVEC) is a modular qualification which can be taken while at school, in further and higher educational institutions or any other centre approved by SCOTVEC. It was introduced

in 1984 as the main vocational education award in Scotland to replace previous vocational qualifications. Modules are taken by most pupils leaving school at 16 and undertaking further education.

To gain an award, all the specified competences or 'learning outcomes' of a module, usually three to five in number, have to be achieved and each module (20 hour or 40 hour) successfully completed is listed separately on the certificate. Assessment is criterion referenced and carried out internally by schools/colleges under the aegis of SCOTVEC.

School leavers with a National Certificate will be able to build on these modules in their subsequent training and further education. Programmes of modules replaced Ordinary National Certificates and Diplomas in Scotland and are equivalent to some non-advanced awards made in England and Wales, including City and Guilds.

Scottish Certificate of Education (SCE) short courses

Since 1989, it has been possible for pupils from the third year onwards to take short courses (eg in electronics, health studies and the creative arts) and these will be added to any other awards gained on the Scottish Certificate in Education.

Higher Still

SEB and SCOTVEC will merge to provide a unified system incorporating the current Higher Grade and Scottish National Certificate. A new Advanced Higher, comparable with A-level and awarded normally after two years of successful study, is under consideration. Higher Grade will still be the minimum standard entry requirement for university in Scotland.

Curriculum in secondary schools in Scotland

The examinations listed above are intended to assess pupils' learning through the secondary curriculum in state schools, a curriculum which is based on national guidelines issued by the Scottish Consultative Council on the Curriculum (SCCC) and approved by the Secretary of State. Secondary pupils up to the age of 16 are required to follow a broad and balanced curriculum based on eight areas of study (modes) of which English, mathematics and science are compulsory to age 16 and a modern foreign language to age 14. The full eight modes are: language and communication; mathematical studies and applications; scientific studies and applications; social and environmental studies; technological activities and applications; religious and moral education; physical education; creative and aesthetic activities.

Despite the broad range of the secondary curriculum, main stream research into gender and attainment is restricted primarily to language (mostly English), maths and science. The other areas of the curriculum have relatively little research relevant to this review.

General Certificate in Secondary Education (GCSE) England & Wales, and Northern Ireland

The GCSE was introduced in 1985 and replaced both the Certificate of Secondary Education and the General Certificate in Education (Ordinary level) in England and Wales as the subject examination normally taken at the age of 16. It is equivalent to Standard Grade in Scotland and is a criterion referenced assessment (rather than the norm referenced 'O'level). It can therefore provide a detailed and informative breakdown of

pupils' competences rather than just comparing individuals with their peer group. GCSE involved substantial course work marked by the teacher and moderated by an external assessor but the amount of course work has been modified in some subjects since the inception of GCSE.

General Certificate in Education, advanced level, England & Wales, and Northern Ireland

Advanced Level normally taken after two years study following GCSE is promoted as the 'Gold Standard' and is the conventional prerequisite for entry into higher education.

2 Entry and performance in Standard Grade and GCSE

2.1 Entrants for standard grade

Girls enter for slightly more Standard Grades on average than boys: 7.8 in 1994 compared with 7.4 for boys. About half this difference is explained by Modern Language Writing options which count as separate subjects and are more popular with girls. Table 1 (see Appendix) from Ganson and De Luca (1995) gives the uptake of Standard Grade by females showing differences over four years.

- *Subjects where percentage of boy /girl entry are about the same*: English, maths and social subjects (with a slight bias toward more male entrants in economics and geography and towards girls in history and modern studies)
- *Subjects where percentage of entrants who are girls exceed boys:* language subjects, biology, home economics (20% are boys) and office and information studies (only 16% are boys)
- *Subjects where percentage of entrants who are boys exceed girls:* physics (less than a third are girls), computing studies (35%), craft and design, graphic communication and technological studies (only 8% girls), physical education (30% girls)
- *Subjects where there has been change over time in percentage of boys/ girls entering for Standard Grade subjects:* Figures for 1991–1994 show that over this period increasingly more boys took up French, German and Russian (though not German or Russian writing), thus complying with curricular recommendations that all pupils should study a modern language. Boys' uptake of Spanish and Italian did not increase over this period – perhaps reflecting the availability of these languages in schools. An anomaly, rather than a trend, is apparent in the figures for 1993 where girls made up nearly three quarters of the entries for Greek which dropped to below half again in the following year. Over four years, there has been a slight increase in the proportion of female entrants in religious studies so that by 1995, girls comprised 62% of entrants. In graphic communication, there was a slightly bigger increase in the proportion of female entrants although still four out of five are male.

2.2 Standard grade performance

Ganson and De Luca (op.cit.) show that as in the previous years, girls gained on average 0.30 of a grade better in 1995 (provisional figures) than boys and did particularly well in language and communication, and creative subjects. Boys did consistently better in physical education.

Table 1 compares the average grades obtained by boys and girls from 1991–1994 calculated by subtracting the average grade obtained by girls from the average grade obtained by boys, ie in English in 1994, boys achieved an average grade of 3.09 and girls 2.70 giving a difference of 0.39. The final column of Table 1 gives the total number

presenting in each subject. The only subject where girls attained lower grades in 1994 was physical education. Otherwise, in 1994, girls gained 0.30 of a grade better in their examination results overall than boys. Girls achieved 0.50 of a grade better than boys in the creative subjects, 0.45 in language and communication mode, 0.37 in the social science subjects and 0.38 in the technology subjects. Despite a steady increase in the number of boys taking French and German, girls performance has improved relative to boys in all modern languages over 1991–1995. Table 2 (see Appendix) shows the mean grade gender difference in modern languages and indicates that girls do particularly well in speaking compared with boys.

One of the advantages of Standard Grade is that it enables performance in different elements to be analysed. In mathematics, biology, chemistry, most elements in technological subjects and about half of social subjects, girls did better than boys in knowledge and understanding. Table 3 (see Appendix) illustrates the internally assessed elements in technological subjects with girls doing especially well compared with boys in the practical and organisational skills. Girls did better at the Standard Grade in the element 'Investigating' in mathematics and in all the social science subjects even in that element within economics where boys achieved better overall.

Fewer girls attempt physics but, those who do, achieve better grades than the boys. However, this is not true for 30% of entrants in physical education who are female and do not achieve better grades than boys. Similarly, where only a small number of boys enter for subjects they do not achieve as high grades as the girls. Whereas highly motivated and competent girls opt for physics, apparently low motivation and/or competence pertains to the boys in home economics and girls in physical education. As in some other subjects, girls do better in knowledge and understanding in physical education but are 0.47 of a grade worse in practical performance. Researchers at the Scottish Examination Board (SEB 1995) comment that there is little research into why boys avoid subjects with a traditionally high female participation compared with considerable research into the reasons for low female participation in those subjects where they are under-represented eg physics.

In making comparisons of groups it is important to remember that calculations are based on ordinal scales as though they were interval scales ie assuming the difference between grade 1 and grade 2 is the same as the difference between grade 6 and grade 7. Another rider is that gender differences in uptake may be associated with different ability profiles as in the example of physics where apparently only those girls likely to succeed take physics.

English and maths are taken by most pupils and are therefore not affected by differential ability profiles of pupils choosing the subject. Girls did significantly better in English and boys in maths (although the latter was not deemed as 'educationally significant' SEB 1995b).

■ 2.3 Entrants for GCSE in England & Wales, and Northern Ireland

In England, Wales and Northern Ireland, differences in gender performance are well established at 16 with more girls than boys presenting for GCSE examinations.

As with the Scottish Standard Grade, gender differences may be associated with uptake: in 1989 girls comprised 53% of total GCSE entries but there were distinct differences in the subjects entered by boys and girls. In English, there were 90% girls and 83% boys, in Maths 90% and 80% respectively. Girls comprised 28% of Physics entrants and 45% for Chemistry. The situation was reversed in Biology where only 27% of entrants were boys. These figures are comparable with entrants for Standard Grade in Scotland.

Elwood (1995) emphasises that we need to examine whether differences are due to lower attaining boys not being entered for GCSE while girls at the same level are. She indicates that data from 1991 shows that even in the core subjects of English and mathematics, fewer boys were entered than girls. For example in English in 1991, 89% of 16 year olds took English which represented 92% of girls in that age cohort but only 86% of boys. In 1992, girls comprised 51% of the total GCSE entry although only 49% of the 16 year old cohort. These figures represented an increase for boys entering GCSE as listed for 1989 by Gipps and Murphy but there continued to be differential proportions of boys and girls entering GCSE.

In Northern Ireland, there has been a fairly stable pattern of entry for GCSE subjects with a greater percentage of girls than boys taking all subjects. In physics and chemistry there has moreover been a small but steady increase in the participation rates of girls. Over the period 1988–1992, the proportion of girls among entrants to physics has increased from about 29% to 33% and in chemistry from 49% to 51%.

2.4 Performance in GCSE in England & Wales, and Northern Ireland

In 1992, for the first time girls left school with a greater overall proportion of grades A-C in maths, science and English – the critical qualifications for students wishing to take A-levels. This was headlined in the press as 'Girls outshine boys in school exams' (TES 8.11.1992).

Girls gained more A-C grades in GCSE than boys, a trend established over the period 1988-1992 (Stobart et al 1992). Gipps and Murphy (1994) summarising trends showed that by 1992:

42% of girls achieved five passes at grades A-C compared with only 34% of boys

14% more girls than boys attained grades A-C in English

11% more girls than boys attained grades A-C in modern languages

Girls attained almost as many A-C grades in maths and science in 1992 as boys compared with 10% fewer than boys in the early 1980s.

There were few subjects with equal outcomes for girls and boys (see Appendix Table 4).

- *Subjects where girls outperform boys:* English, English Literature, French, geography, history and physics
- *Subjects where boys outperform girls:* Biology, chemistry and mathematics.

As with Standard Grade, it could be that in physics the relatively few girls who do enter for the examination are more able. Gipps and Murphy draw attention to the difference in mathematics when course work is optional and they indicate that this cannot be interpreted to mean that girls will always perform better than boys where there are course work components. Stobart *et al* (1992) showed that whereas it was true of most

subjects, girls performed better than boys in French where there was no course work and Patrick (1990) provided further evidence of typical patterns of gender differences in subject exam success in GCSE irrespective of course work. Cresswell (1990) suggested that variation was due to the nature of the course work tasks. There is obviously a complex relationship between entry, mode of assessment and outcome and this will raised again in Section Three.

Chart A (see Appendix) provides a picture of the subjects taken by boys and girls in GCSE who obtained grades A-C (Social Trends 1994). It shows that girls performed better than boys in English, French, history and biology but boys had superior performance in mathematics, geography, chemistry and physics.

Girls have continued to improve their performance in GCSE. Evidence from Elwood (1995) shows that in 1993, girls either gained 8% more A-C grades than boys and in 11 out of 12 subjects, girls attained a larger proportion of A-C grades in GCSE than boys – or there was a very narrow gap between the two groups. The exception was biology where 57% of girls entered compared with 43% of boys but boys obtained 9.7% more passes in the A-C grades than girls.

The superior performance of girls in English in previous years extended in 1993 to girls obtaining 15% more A-C grades than boys. Of particular interest is the shift in mathematics and science, two areas in which boys traditionally did better. In 1993 girls gained 0.7% more A-C passes than boys. This coincides with the introduction of The National Curriculum in England & Wales which has moved single sciences into combined science syllabuses.

D'Arcy (1994) provides an analysis of grades within GCSE subjects in Northern Ireland which indicates that over the five year period 1988-1992, boys attained consistently more A-C grades than girls in mathematics, and biology but girls did better in chemistry and considerably better in physics and English (See Appendix Table 5). Some interesting trends are noticeable: boys' relative performance has improved in physics and that of girls in maths and biology; in chemistry, girls have reversed the previously better performance of boys. Perhaps the most worrying trend is the declining relative performance of boys in English where, in contrast to other subjects, the difference in the relative performance has been increasing over the period 1988–1992.

Gipps and Murphy (1994) draw attention to the complexities of analysing examination performance showing that boys and girls from single sex schools perform differently from their peers in co-educational schools. Similarly Barry (1994) found that whether a school was mixed or not barely affected a performance at A-level in Northern Ireland but religious associations were also important. Gillborn (1992) and others show that the situation can be further complicated by ethnic origins. Smith and Tomlinson (1989) show how complex is relative achievement among students from minority ethnic groups. Comparing students obtaining 'O' level (or equivalent) pass grades in various subjects, each group out-performed the others in at least one subject. For example, Afro-Caribbean students attained relatively more passes in English than both UK/Eire and South Asian students but significantly worse in mathematics. On the other hand the South Asian students performed as well as, or better than UK/Eire students in science, commerce and Asian languages.

Summary points (2)

In relation to standard grade:

- girls take slightly more Standard Grade subjects than boys and on average attain 0.30 of a grade better
- girls do particularly well in language and communication, and creative subjects; boys only do consistently better in one subject, physical education
- over the period 1991–95, increasing numbers of boys studied modern languages but girls' performance improved relative to boys in all modern languages
- performance on different subject elements varies considerably: girls usually dowell on internally assessed elements; boys' grades were more variable than girls' in some elements such as problem solving in science.

In relation to GCSE:

- girls take more GCSE's than boys
- there are distinct gender differences in the subjects taken: just over a quarter of physics entrants are girls and the same proportion of boys take biology. This is comparable with Standard Grade entrants in Scotland
- girls' performance in GCSE is steadily improving over boys
- Regardless of overall grade, there are gender differences within elements of subjects
- in Northern Ireland, the difference in relative performance is decreasing except in English where boys' performance relative to girls' is declining
- factors contributing to performance include course work components and the mode of examination, the kind of school attended and ethnic origin.

3 Staying on rates and Higher Grade entrants

3.1 Educational and training after compulsory school age

More young people are now engaged in education and training after compulsory school age than at any previous time. Surridge and Raffe (1995) summarise recent trends (1985–93) concerning 16–19 year olds in education and training in Scotland. They state that more young people have stayed on to fifth year (S5) of secondary school, and/or entered full-time further education (FE). Participation in sixth year (S6) and in full-time higher education (HE) has increased even faster. The proportion of 19 year olds in HE nearly doubled between 1987 and 1993.

In recent years, there has been a slightly higher staying on rate and uptake of Higher Grade for girls than boys; in 1994, 53% of both the post-Christmas S5 and S6 cohorts were female and in 1995, the S5 Highers presentation group had increased to 54% girls (See Appendix Table 6). Inevitably at Higher Grade, choice is limited by uptake and attainment at Standard Grade subjects. Subjects least successful at retaining girls from Standard Grade were economics and computing studies.

Students stay on after compulsory school age for different purposes and awards. Surridge and Raffe (*op.cit.*) showed that although sixteen year olds with the highest qualifications are most likely to continue in full time education, staying on rates have risen fastest among the lowest qualified – largely due to changes in the labour market and in HE increasing the incentives to stay on and reducing the incentives to leave. Other evidence from Ganson and De Luca (1995) suggests that there are gender differences in the relationships between success at Standard Grade and staying on rates with girls possibly choosing those areas where there know they are likely to be successful. For example girls made up 50% of English Standard Grade entrants in 1993 and performed much better than the boys. It is suggested by Ganson and De Luca that given these achievements, a higher percentage went on to S5 and that this may be the explanation for the fact that 58% of female Higher Grade entrants in S5 were girls. The proportion of boys at mathematics Standard Grade and Higher Grade in 1994 (S5) remained at 49%, their performance at both levels only just significantly better than the girls.

Surridge and Raffe (*op.cit.*) summarise changes in the education, training and labour-market experiences of young people in Scotland since the mid 1980s as evidenced in the Scottish Young People's Survey (SYPS). This includes surveys of year groups from all secondary schools in Scotland, in the spring following the end of S4 (at age 16+) and again 30 months later at about 19 years. The data are based on young people's own reports of their full time status.

Participation in post compulsory education varied according to young people's educational attainment, gender and social class (see Appendix Table 7). The table shows the percentage in each subgroup who entered the route in question: for example, in 1985 39% of males in cohort 1 entered S5 compared with 46% of females. By 1991, these percentages had increased to 48% and 60% respectively indicating the higher participation of young people in post-compulsory education.

Levels of attainment among these self reporting cohorts was correlated with the kind of education and training they pursued after compulsory school age. The SYPS divided the cohorts into three broad attainment bands at O-level or Standard Grade: low attainment is based on having achieved no O/S grades at level A-C/1-3 in S4, medium attainment on one to four O/S grades at level A-C/1-3, and high attainment with five or more.

Surridge and Raffe conclude that the high attainment group had by far the highest participation in S5, S6 and HE; the medium attainment group was the most likely to enter FE and the low attainment group, Youth Training. Females had higher rates of participation in all of the educational routes while males were more likely to participate in Youth Training. These differences remained relatively constant; gender gaps persisted despite increases in the overall levels of participation.

■ 3.2 A-level entry

The situation for A-levels is slightly different from that for Higher Grades. Elwood (1995) indicates that over the last twenty years females have increased their proportion of entries for GCSE A-level from 38% of the total entry in 1970 to 51% of the total entry in 1993 but they do not achieve as well as males in the percentage of higher grades obtained. In all subjects except English Literature, female entry has increased over this period whereas male entries have tended to fluctuate and any increase has rarely been at a similar rate to the increase in the female entry.

Patterns of entry are beginning to match those of GCSE in biology, chemistry, physics, geography and history. However although roughly the same numbers enter French, English Literature and mathematics at 16, a higher proportion of males continue to A-level in mathematics and a higher proportion of females continue to A-level in English literature:

> One of the questions we must ask ourselves at this stage is why when nearly 300,000 girls do GCSE mathematics do only 20,000 go on to participate in the subject at A level and conversely why do 200,000 males take GCSE English literature and only 15,000 go on to take the subject at advanced level? Is it acceptable to 'turn off' a disproportionate number of one gender from a subject?
>
> (Elwood 1995, p6)

Summary points (3)

There is a trend for more young people to stay on at school or participate in other forms of education and training after compulsory school age.

- ➤ Participation in post compulsory education varies according to young people's educational attainment, gender and social class
- ➤ Girls make up slightly higher proportions of those who stay on and enter for Higher Grades and A-levels
- ➤ Higher proportions of girls and boys continue to take A-level English and A-level mathematics respectively
- ➤ Boys are more likely than girls to participate in youth training.

4 Results at Higher Grade and advanced level

4.1 Higher grade

Overall girls have consistently been in the region of 53% of entries at Higher Grade for S5 and S6 in 1993 and 1994. In 1993–94, 49% of girls left school with at least one Higher Grade compared with 39% of boys. Twenty per cent of girls and 16% of boys left school with five or more Highers. This represents considerable improvement in girls' performance relative to boys over a ten year period as Table 8 (see Appendix) shows.

Whereas roughly the same percentage of boys and girls left with more than five Highers in 1984, the difference had widened by 1994. Average examination results are more similar than in Standard Grade for boys and girls: girls achieve just 0.08 of a band better than boys in the all subject S5 average for Higher Grade in 1994 and 0.12 in the S6 average.

In science subjects, girls did less well than boys in Higher Grade biology and chemistry but better in physics. Whereas girls held the advantage in attainment in Standard Grade in geography, history and modern studies, they only maintained this lead at Higher Grade in geography. SEB (Research Bulletin 3) notes that the Practical Exercise counted for 20% in Higher Grade geography and this may have been an important factor in girls' average superior grades. The question is whether or not girls will retain this lead when the Practical Exercise is dropped in 1996.

In 1994, boys had more extreme results in mathematics with more band A's and 'no awards' whereas the girls' achievement clustered in the middle bands. Ganson and De Luca (1995) found that this pattern no longer applied in 1995 when girls obtained one tenth of a band better than boys overall. This improvement in girls' relative performance in mathematics accounted for the overall mean band difference at Higher Grade of one sixth of a band better than boys in S5 (provisional figures).

The latest figures (when going to press) show that girls have continued to leave school with better qualifications than boys in 1994–5: 19% of girls and 15% of boys leaving with five or more Highers (Source: Scottish Office Statistical Bulletin Edn/E2/1996/9).

4.2 A-level

The superior performance demonstrated by girls in GCSE is not maintained but rather reversed at A-level in the UK. More girls stay on and take more A-levels than boys but boys achieve higher grades overall and are more likely to achieve the maximum points score used for university entrance than girls.

One in 8 boys compared with one in 11 girls gained equivalent of three A grade A-levels in 1992. At A-level, probably the most important stage in embarking on a career, there is a cross-over in gender-related performance patterns between 16+ and 18+

examinations which results in males doing better in the higher grades at A level having been behind at 16. Research in progress focusing on the performance of boys and girls in English literature, mathematics and physics suggests the complex nature of the interaction between gender and A-level performance (Elwood 1995).

Montgomery (1994) explored the current situation for girls in Northern Ireland where there is still selection at age of 11 for grammar schools. As can be seen in Table 12 (see Appendix), more school leavers in Northern Ireland gain three or more A-levels compared with England and Wales. However, a much higher proportion of Northern Ireland school leavers have no formal qualifications (Cormack, Miller and Osborne, 1987). At A-level male average scores in N.Ireland were significantly higher ($p<0.01$) than those of females (Barry 1994) whatever the type of school attended. However there were slight differences between schools with boys and girls doing their best in co-educational grammar schools and single sex grammar schools but less well in co-educational or single sex secondary school.

Summary points (4)

In terms of performance at Higher Grade and A-level:

- girls comprised slightly more than half the Higher Grade entries in 1994 than boys and achieve slightly better grades on average overall
- girls performance relative to boys continues to improve in Higher Grade, with girls' relative performance in mathematics being better than boys for the first time in 1995
- at the highest attainment levels in Scotland, four per cent more of girls than of boys left with five or more Higher Grades
- in A-levels, girls in England, Wales and Northern Ireland do not retain the superior performance compared with boys demonstrated in GCSE

  more girls stay on and take more A-levels than boys but boys achieve higher grades overall at A-level.

5 School leaving age and qualifications

Girls are more likely than boys to stay on at school and to gain higher qualifications overall although it is difficult to identify the relative proportions of males and females under 18 taking SCOTVEC modules.

5.1 School leaving age

Girls have generally tended to stay on longer at school than boys but Scottish Office figures (Scottish Office Statistical Bulletin Edn/E2/1995/14) show that overall there is a trend over the last ten years for more boys and girls to remain at school into the sixth year with 43% of pupils staying on until then in 1993–94. Over the previous ten year period, there had been a reduction in the percentage of pupils leaving at school-leaving age: 49% in 1983–4 compared with 31% in 1993–94. There was a corresponding increase in those who left from S6: 23% in 1983–84 compared with 44% in 1993–94. Nevertheless boys were still more likely to leave when they reached the school leaving age (35%) than girls (26%) in 93–94 compared with 52% and 44%, respectively, in 83–84: more girls (48%) than boys (41%) stayed on into the 6th year (see Appendix Table 13).

This increase took place over a period of substantial unemployment for people of all ages, reductions in the availability of long term apprenticeship schemes and changes in financial support available for young people. These are just some of the factors which could increase the attraction of staying on at school and the motivation to gain qualifications.

5.2 Increase in school leavers' qualifications

Not only are pupils staying on longer, they are also gaining more qualifications and over the ten year period, there has been a marked decline in the numbers of pupils leaving without any qualification (about 9% in 93–94). Boys are more likely than girls to leave school with no SCE qualification. Nearly 10% of boys and under 8% of girls left school in 93–94 with no qualification and this dropped to 9% of boys and 7% of girls in 1994–95 (Source Scottish Office Statistical Bulletin Edn/E2/1996/9). Two factors have contributed to the increase in school leavers' qualifications: first is the expansion of SCOTVEC modules available for both school pupils as well as for the general community and the second is the introduction of Standard Grade.

Most SCOTVEC module registrations in 1993–94 were in schools, with girls making more module registrations than boys (See Appendix Table 9). There are difficulties in analysing the success of boys and girls in modules. Summary statistics for gender do not distinguish between students at school and those who are mature students or who are young people registered elsewhere as well as, or instead of, at school. Data are however available in the Scottish Office statistics on school leavers' qualifications and presented in the annual School Leavers' Survey commissioned by the Scottish Office (See Appendix Table 10).

Among school leavers in 1993, girls obtained more modules than boys and 50% of girls had gained at least one SCOTVEC module compared with 42% boys. Patterns among the school leavers included in the survey are comparable with those published by the Scottish Office for the analyses of pupils' achievements in the Scottish Certificate of Education (SCE) examinations where overall girls were better qualified than boys when they left school: 49% of girls left school with at least one Higher Grade compared with 41% of boys. Table 11 (see Appendix) shows the highest qualification by Scottish pupils obtained in the range of examinations contributing to the Scottish Certificate of Education.

School leavers from the 1992–93 academic year left school with similar levels of SCE qualifications to those of 1991–3 leavers (Lynn 1995). For example, the proportion of 1993 leavers who left with at least three Higher Grades was 30%, the same as the corresponding proportion of 1992 leavers. This represents a steady increase in SCE qualifications of school leavers since 1988. As mentioned above, girls left school better qualified than boys on average, obtaining more Higher Grades and with fewer girls than boys leaving without any SCE qualification (Table 14).

Other points brought out in the analysis related to correlations between success in gaining qualifications and factors such as parents' level of education and socio-economic status, and self reported truancy. Persistent truants are unlikely to gain many qualifications, but there were no differences between boys and girls in the proportions who claimed to have been persistent truants, or who had truanted at all.

Nearly half the leavers had gained at least one SCOTVEC module while at school. SCOTVEC modules were most common amongst those who had also gained three or more Standard Grades, or one or two Higher Grades.

The other significant development was the introduction of Standard Grade over the period 1984–1992 to replace Ordinary Grade and to enable all S4 pupils to be certificated. The resulting increase in qualifications at Standard Grade was accompanied by an 11% increase over the previous ten years of pupils achieving at least one Higher Grade: 33% in 1983–4 compared with 44% in 1993–4 (Scottish Office Statistical Bulletin Edn/E2/1995/14).

One of the most interesting features is that until 1986–87, similar percentages of boys and girls (about 11%) left with 5 or more Higher Grades. By 1993–94 a gap had emerged with 20% of girls leaving school with five or more Higher Grades compared with 16% of boys.

■ 5.3 Comparisons of male/female attainment across the UK

Across the UK as a whole, there has been an increase in the number of school leavers with an educational qualification. Chart A shows that in 1990–91, 25% of boys and 29% of girls obtained at least one A-level or Higher Grade whereas fifteen years earlier, only 18% of boys and 16% of girls had reached this level. (See Appendix Chart B).

These improvements are not consistent across all parts of Great Britain as can be seen in Table 12 (see Appendix). More pupils from Northern Ireland left school

with one or more A level passes than in England or Wales. About one in five school leavers in Northern Ireland and in the south east of England left with three or more A-levels – more than in any other region (Social Trends 1994). However also in Northern Ireland, as in Wales, more than one boy in six left with no graded results. Direct comparisons are difficult to make with Scottish qualifications but it is apparent in Table 12 that girls across the UK attain more of the advanced qualifications and fewer leave without qualifications.

There is no doubt that gender differences exist in GCSE examination outcomes but as D'Arcy (1995) says, 'the key question is whether differences such as these should be expected and accepted' (p20).

In relation to Northern Ireland, Montgomery (1994) quotes from a range of sources to show that girls outperform boys at all examination levels (See Appendix Table 12). More girls than boys stay on at school in Northern Ireland but, nevertheless, Barry (1994) found from analysing the grades of only those pupils who take GCSE, female average scores are significantly higher than boys'. For example, 29% of girls leaving school in 1989/90 attained two or more A-levels, and 6% left without any qualification. Comparable figures for boys show 23% of boys with two or more A-levels, and 14% leaving without any qualification.

There are other factors to take into account in comparing results in Northern Ireland and the rest of the UK. The figures in Table 12 pertain regardless of whether pupils were attending secondary or grammar school, Protestant or Catholic. It should be noted that until after 1988 in Northern Ireland, boys and girls were marked separately in the Transfer Tests to secondary education at 11 plus. A grade A was allocated to the top 20% of boys and the top 20% of girls rather than the top 20% of all pupils. (A similar situation operated in England and Wales for the duration of the 11 plus selection tests.) Although this was justified in terms of girls' earlier intellectual development, Barry (1994) suggests that on the basis of current female attainment levels, it now seems doubtful that boys ever catch up. As an outcome of a Judicial Review carried out at the request of the Equal Opportunities Commission in Northern Ireland, after 1988 boys and girls were not treated as separate populations for the 11 plus.

In 1991/2 about 39% of girls achieved the top grades in the 11 plus compared with 32 % of males and this gap widens through secondary school. This position is reversed at A-level where in 1991/92 male average scores were significantly higher ($p<0.01$) than those of girls. Barry (1994) suggests this may be partly related to subject choice and partly due to the smaller number of boys taking A-levels which improves their overall standard of attainment.

Summary points (5)

Considering the staying on rates and level of qualifications gained by the time boys and girls leave school:

- over the period, 1984–1994 across the UK more pupils stayed on after compulsory school age and the probability increased of girls staying on longer at school and leaving school with better qualifications than boys in 1993–94
- especially among the least qualified pupils, a range of socio-economic factors could be increasing pupils' motivation to stay on longer at school: low employment prospects, reductions in long term apprenticeships and changes in financial support for young people are some of these factors

- in Scotland, there continue to be gender differences in the uptake of various subjects with girls presenting for more educational awards – including vocational qualifications – than boys
- across the UK as a whole, there has been an increase in the number of school leavers with an educational qualification. In Scotland, girls attain more advanced qualifications and, compared with boys, fewer leave without any academic or vocational qualifications
- there is more variability in Northern Ireland where pupils gain more A-levels than anywhere else in the UK but where also girls outperform boys at all examination levels and there are more boys leaving without any educational qualification.

6 Entrants to further education (FE) and higher education (HE)

Not all young people continue their education after school although increasing numbers do make use of the very wide range of opportunities available now in further and higher education. What happens to young people after they leave school can be identified through the FE/HE statistics kept by the Scottish Office, SEB and SCOTVEC and through surveys of school leavers.

Despite the increasing percentage of young people going on to further and higher education after compulsory schooling, this remains a relatively small percentage by international standards (Feingold 1990; Sammons 1995). Certainly public examinations at 16 and after (GCSE, Standard Grade, Highers and A-levels) act as filters for many further and most higher educational possibilities but it is curious that more of the girls who do comparatively well in these examinations compared with boys do not pursue subsequent educational qualifications.

In this chapter, I first summarise the destinations of school leavers as set out in the Scottish School Leavers Survey for 1994.

6.1 The Scottish School Leavers Survey (SSLS) (until 1991 Scottish Young Persons Survey)

The annual survey of school leavers and a follow up survey of an age cohort of young people about the education and employment of young people after they leave school, link with information from SEB and SCOTVEC to provide a picture of education and training after compulsory school age. The latest published leavers' survey (Lynn 1995) was based on a 10% sample of leavers from S4, S5 and S6 in 1992–93. The follow-up in spring 1995 will be based on a 10% sample of young people who were in S4 three and half years earlier ie 1991–2, some of whom will have left from S4, others subsequently from S5 or S6.

The findings show increased numbers of young people continuing in full time education after leaving school with the biggest increase (from 9% to 15%) among those who are least qualified. Compared with 1992 leavers, the biggest increase in the proportion remaining in education in 1993 was amongst those with no qualifications, or Standard Grades at grades 4–7 only. Despite this increase, the probability of remaining in full time education improved with higher levels of qualifications gained at school. This pattern was uneven across Scotland. The lowest proportions of leavers who stayed on in full-time education were in Central and Fife regions (38%) and the highest in Borders and Dumfries and Galloway regions (52%).

By November 1993, 61% of 1993 leavers had started some kind of educational course with about a third going into higher education and slightly fewer (29%) into either part-time or full-time further education. Entry to degree courses, other Higher Education courses and Higher Grade courses was, not surprisingly, highly correlated with SCE qualifications gained at school. Entrants to SCOTVEC National Certificate courses on

the other hand were drawn from a broad range of SCE qualification levels. Those who had already gained some SCOTVEC modules at school were the most likely to have started further SCOTVEC modules since leaving school.

Nearly a year after they had left school, nearly two out of five 1993 school leavers were still looking for a job and 29% were in full time work. More girls (45%) than boys (4%) had gone on to full-time education and more boys were in full time work (30%). Comparative percentages are in Appendix Table 15 which also shows the numbers of males and females on training schemes.

Of the 1993 leavers, 29% had begun some sort of further education – SCOTVEC, other non advanced courses or Higher Grades. Some may have subsequently dropped out but proportions to have started each type of course did not differ significantly between boys and girls.

The SSLS points up interesting differences between young men and women in the nature of full time jobs or training schemes among school leavers in 1993. Forty one percent of girls were in clerical and secretarial jobs while nearly half the boys (48%) were in craft and related jobs; the picture had been very similar in 1992. Employment rates in different industries were also quite different for boys and girls. Boys were much more likely to be in construction industry (26% compared with 1% of girls) and girls were more likely to be in education, health and social work (18% compared with 3% of boys) or other community, social and personal services (20% compared with 5% of boys).

There were clear differences between males and females in the opportunities to develop further qualifications through training on, or off, the job or through a recognised apprenticeship. As is shown in Table 16 (see Appendix), boys among the 1993 leavers were more likely than girls to get each of these opportunities.

6.2 Scottish higher education

The numbers of students in full time higher education in Scotland increased from under 85,000 FTE in 1983–84 to just under 142,000 in 1993–4 (Source: Scottish Office Edn/J2/1995/13). Tables 17 and 18 (see Appendix) show the increase in the proportion of men and women in full-time and part-time higher education over this period. What is particularly interesting is that the percentage of part-time entrants who are female has shot up from 22% in 1983–84 to 43% ten years later, with the most remarkable gains in the FE colleges. Furthermore, women now make up the majority of part-time entrants to higher education institutions. The increase in the proportion of full time women entrants to higher education programmes has been much more gradual – from 46% of full-time entrants in 1983–84 to 48% in 1993–94. The increase has been most evident in the FE colleges where the proportion of women increased from 43% to 47% of full-time entrants in this same period.

A number of factors may have contributed to these changes. There has been a decline in the number of teacher education places available and large numbers of well qualified girls have consequently chosen other routes of higher education. Further education colleges have opened up more higher education programmes and may be more flexible for students wanting to register for part-time modes of study. These undergraduate figures will include many mature students with family responsibilities who have to adapt their study times to fit in with full-time jobs and/or childcare. There may well be other reasons for the increases such as a more supportive environment, greater accessibility or even a more aggressive marketing policy by the FE colleges. It may also be a question

of the subjects being studied. This review has not investigated these or other possible explanations. Research in Scotland has identified differences in the access men and women have to education after they leave school, in the course they choose, in their motivation for returning to study and in their needs for education at different times in their lives. Blair *et al* (1993) and Lowden *et al* (1990) provide helpful summaries of the factors involved and of relevant studies. Interestingly women who return to education tend to want to widen their interests – and are most likely to pay for themselves; men largely return for courses related to their job and are more likely to be paid for by their employers.

Despite the increased number of women now in higher education, there are still proportionally more qualified girls than boys who are not opting to become undergraduates. Another issue mentioned by Gillian Sutherland of Newman College, Cambridge in a recent radio interview is that women are not doing as well in mixed colleges as had been expected and that they are not achieving as many first class degrees as men. She ascribes this partly to the different rules of debate and argument deployed and applauded by men. Women are faced with the difficult decision either to compete within the masculine style or to maintain their own ways of working which are unlikely to be rewarded with higher class degrees. These observations relate to styles of learning developed by boys and girls throughout their schooling.

6.3 Race and class factors related to uptake of further and higher education

Researchers have considered a range of factors which affect the take-up of higher education. Lindsay Paterson (1992) has examined the relationship between socio-economic characteristics, staying on at school and entering HE. Given the equivalent levels of attainment, staying on rates beyond the minimum leaving age are higher among pupils with well educated parents. Staying on rates in 1990 show that 73% of pupils with fathers in the top two socio-economic groups stay on after compulsory school age compared with 34% among the lowest two socio-economic groups. However there is reason for optimism since the percentage of these lowest socio-economic groups going on to HE had doubled since 1980.

Among pupils with approximately the same number of Higher Grade passes, application rates to higher education are greater among those whose parents also stayed on at school after the minimum leaving age than for those whose parents left earlier. Paterson's analysis (1992) showed that with all other things being equal, parental education could make a difference in attainment of about one 'O' grade. Father's occupation correlated with three quarters of an 'O' grade difference. Mother's occupation and family size each made a difference of about a quarter of a grade but Paterson was unable to identify differential effects of parental education on boys and girls.

It has not been possible to examine the relationship between race and gender among entrants to F/HE in Scotland since figures on ethnicity are not published centrally either by the Scottish Office, SHEFC or FEFC.

Corner (1987) found that the overwhelming majority of a sample of 88 ethnic and minority school-leavers in Glasgow wanted to pursue their education to a further education or tertiary college or university. There is no clear picture of how many of such ethnic and minority school-leavers actually continue their education nor of how many were sufficiently qualified to continue studying beyond Standard Grade. Language is an

important factor in achievement. Gillies (1989) showed that bilingual Asian boys were under-achieving in English and probably 'language-heavy' subjects like history and geography in Ordinary and Higher Grade. The families of this group of Glasgow students came mainly from Pakistan, India and Hong Kong and therefore represented diverse cultures and attitudes to the education of boys and girls.

Tariq Modood and Michael Shiner (1994) have produced one of the few reports on take up of higher education in UK institutions by ethnic minorities. Their work shows different take up rates among different ethnic groups – for example, students from Chinese minority groups are relatively highly represented. Modood and Shiner analysed UCCA and PCAS 1992 data and found wide variations in application and acceptance rates between ethnic groups, and between universities and (what were then) polytechnics. The analysis showed that in comparison with the population size of the ethnic groups, Chinese and Black Africans were over-represented whereas others, such as Bangladeshi applicants, were consistently under-represented in both applications and admissions. Over the three years 1990, 1991 and 1992, there was an increase in the proportion of ethnic minorities admitted to university. Some groups – especially African-Caribbean's – were also under-represented among entrants to universities and over-represented at polytechnics (now 'new universities). Women from minority ethnic groups were significantly less likely ($p<0.001$) to have been admitted to universities and polytechnics than men.

6.4 Overview of education and training in Scotland

A bulwark of government policy has been to improve the education and training of our workforce. To oversee and encourage progress in this area, the Advisory Scottish Council for Education and Training Targets (ASCETT) was set up by the government in 1993. Two key targets have been set for the year 2,000. Target 1 (85% of young people to attain the Standard Grade/SVQ Level II) is likely to be met since the annual increase in young people attaining these qualifications is 4.1% where only 2.1% is necessary to meet the target by the year 2,000. However the most recent report (1995) suggests that at the current rate of progress, Scotland will not achieve Target 2 which is for seven out of ten young people to have three Higher grades or SVQ level III. At present 73% of people up to the age of 18 have attained five Standard Grades/SVQ Level II (or equivalent) and 51% of young people up to the age of 19 have attained three Higher Grades/SVQ level III (or equivalent). ASCETT estimates that the current annual increase required to meet the latter target is 3.1% compared with the actual annual increase of 1.7%.

Scotland seems to be making better progress in improving education and training of the workforce than Northern Ireland, England and Wales but, as mentioned earlier, there are considerable variations in different regions. For example Glasgow, Forth Valley and Lothian are behind Dumfries and Galloway and Borders which have already reached both targets.

The 1995 (provisional) figures continue to demonstrate gender differences in achievement of SVQ levels II and III. While 57% of girls aged 15 achieved Target 1, only 46% of boys did. Over the two year period, there has been a greater increase in girls (12% point increase) than boys (10% point increase) achieving this Target. By the age of 19 there is a reversal of this gender gap with males having an overall achievement level greater than that of females. ACSETT (1995) suggests that there is a need to address the issue of females achieving less through the vocational route. (There is no mention of males achieving more through the academic route although, as we have seen elsewhere in this review, their academic performance is lower than that of girls.)

Summary points (6)

In looking at the trends in staying-on rates, final qualifications on leaving school and take-up of further education and training:

- more girls than boys continue their education after leaving school and more boys go into full time jobs
- fewer girls than boys took up training and apprenticeship opportunities likely to lead to further vocational qualifications
- there are clear gender differences in the nature of full time jobs taken up by school leavers with males more likely to be in the construction industry and girls in clerical, secretarial, education and other community services.

The numbers of students in higher education has increased dramatically over the ten year period reported in the latest Scottish Office statistics (1995) and the proportion of men and women in FE and HE has changed considerably:

- although there has been a gradual increase over ten years in the proportion of full-time students who are female, women now comprise a much higher percentage of part time students than they did in 1983–84
- the most dramatic increase has been in the percentage of part-time entrants to further education colleges who are women
- women now comprise more than 48% of full-time and more than 43% of part-time entrants to higher education
- proportionally fewer well qualified girls than boys are entering higher education.
- The level of parents' own education is one of the most important factors affecting staying on rates and take up of higher education among students of similar achievement
- little data is available on ethnic origin and the relative entrance rates and achievement of young men and women from minority ethnic groups in F/HE in Scotland
- The implementation of government initiatives to improve standards of education and training for young people is making better progress in Scotland than elsewhere in the UK. Nevertheless it is unlikely that 70% of young people will attain SVQ Level III or three Higher Grades (or equivalent) by the target date, year 2000.

7 Gender and performance at school

I now turn to how the foundation of performance in public examinations at secondary schools in the UK is laid down in the relative achievement of boys and girls earlier in their school careers. This part of the review focuses on the Assessment of Achievement Programme (AAP) in Scotland, the Assessment Performance Unit (APU) in England and Wales, assessment within the National Curriculum in England and Wales and the outcomes of a longitudinal study, 'School Matters' carried out in Inner London. These studies which between them have received the overwhelming amount of resources allocated to monitoring educational achievement have in some ways been narrowly focused; very little attention has been paid to areas other than the core subjects: language, mathematics and science and some slight review of technical subjects including home economics.

■ 7.1 Assessment of Achievement Programme (AAP)

The Scottish AAP surveys of pupils' attainment in Primary 4, Primary 7 and Secondary 2 are intended to provide a longitudinal, representative picture of the national levels of attainment, and development of skills and knowledge.

The surveys have covered five areas but, as can be seen from the table below, longitudinal evidence is only available for the core subjects – mathematics, English language and science.

Surveys in the assessment of achievement programme

Subject area				
Technical Education	1985			
Home Economics	1985			
Mathematics	1983	1988	1991	(1994)
English language	1984	1989	1992	(1995)
Science	1987	1990	1993	

AAP – language

The AAP language surveys show superior average performance by girls at all three ages in reading, writing and talking, with a few specific tasks where boys are superior. (AAP 1988, 1993a, Napuk *et al* 1993). For example in the 1992 study boys in P7 performed significantly better on a video tape listening task and on the *Kon-Tiki* reading task (Scottish Office 1993a). In terms of the writing tasks, girls at P4 and P7 were better than boys in the choice and use of language and in mechanical skills tasks. Differences in the importance given to gender in AAP publications is interesting. The main summary published by the Scottish Office (1990) of the 1989 English language survey makes no mention of gender differences although these were apparent since the first survey

(Johnson 1995). Despite the superior performance of girls in language, no reference is made to gender differences in the findings or points for teachers to consider in the *Feedback* series prepared especially for teachers (Scottish Office 1991a 1991b). However in summarising the 1992 survey considerable attention is paid to gender differences in relation to the different language tasks but not in comparing performances over time (Scottish Office 1993a).

AAP – mathematics

The 1991 mathematics survey carried out by a team at Strathclyde University was concerned with three main categories of the mathematics curriculum: information handling; number, money and measurement; shape, position and movement. These were linked with features of the SOED's consultation paper preceding the 5–14 Development Programme Guidelines and led to some modification in the selection and construction of written and practical tasks previously used in the 1988 survey carried out by Northern College of Education. Nevertheless half of the tasks used at P4 and P7 and almost two thirds of those used at S2 were re-used in 1991 in an identical form. Comparisons over time have to take account of the differences in the tasks set for pupils and the extent to which they may still be pertinent to pupils experiences within and out with school.

Analyses by gender showed no significant differences at P4 and P7 stages. At S2 boys did better (at the 5% level of significance) than girls in some of the number tasks and girls were better in arithmetic (at 1% level of significance in addition and subtraction and 5% level in multiplication and division). Girls were also significantly better in position and movement tasks and boys on one out of the 27 tasks within the 'shape, position and movement' area. There were no significant gender differences in the practical aspects of mathematics assessed. (Scottish Office 1993)

AAP – science

In science, the assessment framework used seven categories of knowledge, understanding and skills which were assessed in written and practical tasks. The latest evidence in science is from the 1993 survey carried out by staff at Strathclyde University. There was no overall gender difference in performance but as with mathematics there were differences on different tasks. Looking at the findings across all age groups but most significantly at S2, boys were better in knowledge type tasks which covered recall and explanation; girls were better in process type tasks such as handling information, observation, inferring and investigative skills. (Scottish Office 1994a: AAP). The Scottish Office concludes that over the period 1987–1993, there has been little in the way of a clear indication of change, with success rates rising and falling across categories in a fairly random manner (p.50). The summary of findings across the three AAP surveys undertaken in science suggests that the approaches to teaching science in secondary schools may not be equally relevant to girls and boys and highlights the importance of variety in tasks, content and format of assessment. However, this is not stated explicitly in the points for reflection and discussion issued to teachers in the *Feedback* series (Scottish Office 1994b: AAP). The final topic for discussion in *Feedback 2* asks teachers to consider the 'balance' of process/ content and physical/biological activities and asks...will anyone be disadvantaged by this (the balance)? It is left to teachers to infer gender could be one factor although it is clearly signalled as important in the review of gender issues carried out by Sandra Johnson (1995).

AAP – Technical education and home economics

The AAP has only included one survey of Technical Education and this was carried out among a representative sample of S2 pupils by Northern College in 1985. Technical

Education included craft studies traditionally associated with boys (eg woodcraft, metalcraft, plastics etc) but did not include crafts traditionally associated with girls (eg needlecraft) which were dealt with in a companion survey of Home Economics also carried out at the same time by Northern College. The Technical Education survey found that in most cases boys performed about 5% better than girls and more in technical drawing. It was noted that the 'common course' followed by the different sexes *was not wholly common* (Scottish Office 1988: AAP p5) and suggested that different performance may result from differences in motivation and educational experiences.

The reverse pattern was true in Home Economics with girls scoring consistently about 5% higher on average than the boys. There were very wide differences in the course content across Scotland and it may well be that the development of 5–14 guidelines will address the different educational experiences of pupils in this area.

■ 7.2 Assessment Performance Unit (APU)

The Assessment of Performance Unit (APU) was established by the then Department of Education and Science for England and Wales in 1974 in order:

> To promote the development of methods of assessing and monitoring the achievement of children at school and seek to identify the incidence of under achievement.

The intended scope of the APU was not fully implemented before its closure in 1991. Annual surveys had been undertaken in : mathematics, (11 and 15 year olds in 1978–82 and in 1987), English language (11 and 15 year olds in 1979–83 and from 1988), foreign languages (1983–86), science (1980–84) and a single design and technology survey for 15 year olds in 1988–89.

The longitudinal studies highlighted performance within subjects and within subgroups over time and surveys were to be carried out of pupils at 11,13 and 15 which would have provided comprehensive trends related to a number of factors linked with performance including gender. The following points are taken from reflections on the APU by Gipps and Murphy (1994).

Gipps and Murphy summarise a wide range of what they consider are the differences in influences on the achievement of boys and girls: learning opportunities, attitudes, individual test items or their administration, different experiences within and out with school, perceptions and approaches to problems and to the content of test items, styles of expressing themselves.

Gipps and Murphy refute any biological explanations to account for the differences because the APU surveys reveal a relatively stable pattern of performance within subjects and with greater variation within groups than between groups. This led them to conclude that differences in achievement across the APU subjects surveyed, including spatial abilities, are to a large extent related to differences in opportunities to learn (p146). They suggest that a group of boys or girls may be relatively advantaged or disadvantaged because they have different experiences of (among other things):

- the context of the task – ie the setting
- the content – ie what the task is about
- the task demand – eg to write a letter to a friend
- the mode and style of responses expected.

Gipps and Murphy provide an interesting note (p151) about the salience of gender in the APU reports. In the early and mid 1980s, science, language and maths reports reflected

interests in equity and gender differences but this fades by the final language report and is absent in science reports through the late 1980s and early 1990s perhaps partly because gender was no longer on the political agenda.

7.3 Assessment within the national curriculum in England and Wales

White (1995) has found evidence of early patterns of performance assessed at ages 7, 11 and 14 corresponding with performance at 16, and the new assessment schemes associated with the National Curriculum, will provide opportunities to monitor these patterns. The National Curriculum and its assessment in England and Wales, lays down what should be taught at school 5–16 with attainment targets for each subject broken down into ten hierarchical levels of statements of attainment (SoAs). There are four key stages (5–7, 7–11, 11–14 and 14–16) with compulsory testing of all pupils at ages 7, 11 and 14. This is in addition to continuous assessment by teachers which may include some voluntary tests such as practical assessments in science. Older pupils are assessed through the public examination system, the GCSE, which is used to assess the national curriculum at 16.

The assessment system is still relatively new but Gipps & Murphy (*op.cit.*) report that at ages 7 and 14 in 1991:

- girls scored higher than boys especially in English and maths with more boys scoring at the extremes
- minority ethnic groups scored lower than 'white ' children.
- children whose home language is not English scored less well
- teacher assessment was lower than the Standard Assessment Task (SAT) score for children from ethnic minorities and/or whose home language is not English.

(SATS now comprise pencil and paper tests and are known as Standard Tests, ST.) Gipps and Murphy are especially critical of the process that hastily produced reading comprehension and spelling tests in 1992. They claim that there was very gross analysis of performance by ethnic group at Key Stage One. Furthermore they suggest that government insistence on shifting away from performance assessments to short timed written tests had considerable equity implications for children with special needs and minority ethnic groups as well as girls (p206). Their anxiety is that:

> The shift to shorter written tests may depress the scores of girls and reinforce the current imbalance of subject take-up beyond GCSE unless Teacher Assessment has a major role to play in determining national assessment results.
>
> (p207)

There is a serious criticism of the Schools Examination and Assessment Council (SEAC) the supervising body until 1994 who, according to Gipps and Murphy, did not articulate a theoretical position in relation to equity issues. Reports from SEAC make little comment on gender except to question girls' superiority in maths at 14. On the other hand when pupils who spoke English as their second language scored higher on SAT than on teachers' assessments, this was not regarded with anxiety but as evidence of the equitable or benevolent nature of the assessment (p209). This provides another example of how equity issues appear to have slipped down the political agenda since the 1980s.

■ 7.4 'School Matters'

Sammons (1995) showed that over 9 years of their school career, girls gradually pull ahead to reach superior performance at GCSE. In a longitudinal study, the 'School Matters' (1980–1990) which tracked a cohort of Inner London pupils from the beginning of junior school through to GCSE, girls outperformed boys in traditional tests of reading and (at age 10) mathematics. They also made greater gains overall during secondary schooling in terms of total GCSE performance in 1989. Sammons (1995) indicates that these results for Inner London pupils are in line with national analyses of gender differences in absolute attainment which demonstrate that in terms of GCSE results, girls outperform boys at age 16 (National Consortium for Examination Results 1992).

Sammons herself raises some of the problems of longitudinal studies when she notes (p.480) that only 49% of the original sample (2287 pupils) at junior school were available for testing at secondary level. Therefore comparisons could only be made for the scores of 995 pupils for scores on the London Reading Test and GCSE examination. These figures also excluded those who did not enter for GCSE many of whom would be relatively low achievers.

Summary points (7)

Longitudinal studies show that school leavers' achievement in public examinations generally reflects the progress of pupils through their school career in the core subjects of English language, mathematics and science, with girls gradually pulling ahead to outperform boys at the age of 16.

- In AAP and APU studies, girls show superior average performance in language throughout their school career; there are few gender differences in mathematics until the age of 14 when boys and girls are significantly better than each other on specific tasks; similarly in science, there are differences in particular tasks but not in general overall achievement. Stereotypical gender skewed performances are found respectively for boys and girls in the single studies on technical education and home economics. Assessments related to the National Curriculum show that at ages 7 and 14 in 1991, girls scored higher overall than boys especially in English and maths but more boys scored at the extremes
- It is suggested that any differences between boys and girls could be due to a wide range of factors to do with experiences as well as related to a task and its assessment
- There is some evidence that teachers may be underestimating the abilities of children from minority ethnic groups or whose first language is not English
- Monitoring reports do not consistently refer to any gender differences and gender has declined as an issue in monitoring pupils' progress
- Feedback for teachers could be more explicit in reference to gender.

8 Gender and achievement in the UK and other countries

Sandra Johnson from a Scottish perspective, and Gipps and Murphy from England and Wales, have between them compared the performance of pupils in the UK with those elsewhere in Europe, the USA and internationally. They use evidence from the *AAP* and *APU* studies to compare with data from the cross national surveys:

- *international Association of the Evaluation of Educational Achievement (IEA)* (which covered science and maths of pupils at 13 and in their last year of school)
- *international Assessment of Educational Progress (IAEP)* (international surveys in mathematics and science in the late 1980s and early 1990s of pupils of 9 and 13)
- the *National Assessment of Educational Progress (NAEP)* in the US (with periodic assessments of language, maths and science among pupils of 9 years, 13 years and 17 years since 1969 and periodically young adults from 26 to 35)
- the Dutch National Assessment Program in Education *(PPON – Periodieke Peiling van het Onderwijsniveau)* (launched in the late 1980s for language, mathematics and science among primary pupils)
- and the Canadian *School Achievement Indicators Program (SAIP)* (initiated in the late 1980s with national surveys now completed in language and mathematics among secondary pupils).

It is difficult to make cross cultural comparisons since, as Gipps and Murphy emphasise, definitions and assessment are so culturally and context dependent. Moreover in the surveys mentioned above, there is no critique of the tests used and it is difficult to make longitudinal international comparisons as items used in the test are not all released. No doubt aware of these limitations, Johnson provides a succinct summary of language, mathematics and science performance as measured in the various surveys.

8.1 Language

Johnson (1995) draws on evidence from the international surveys and APU to confirm that girls across the world outperform boys in language throughout their school career. Some of the studies quoted by Johnson (Thorndike 1973, Elley 1991) suggest that the gap between male and female performance narrows over the period between the ages of 9–14 but others (NAEP 1993, Keeves and Kotte 1994, SAIP 1994) show that the performance gap in reading and writing persists through the three stages of schooling assessed, ages 9, 13, and 16/17.

Specific language skills have been assessed in The Netherlands for pupils aged 8 and 12. Twenty five different aspects of reading/listening were assessed at age 8, and seventeen at age 12. Girls showed considerably superior average performance on twenty three aspects at age 8 but this dropped to ten areas of superior performance compared with boys at age 12. Interestingly, whereas girls were better with fictional material, boys

were better in functional reading tasks including instructional material, maps, tables. As far as writing was concerned, girls produced superior average performance on 35/40 aspects, half of which were of statistical significance.

The AAP surveys have also shown superior average performance by girls at all three ages in reading, writing, and talking, again showing a few specific tasks where boys were superior (AAP 1988, 1993a, Napuk *et al* 1993).

8.2 Mathematics

On average, boys outperform girls in mathematics and by school leaving age they are achieving better performances in virtually all aspects tested in mathematics. Johnson (1995) acknowledges that large scale performance surveys (eg IEA, IAEP) confirm what was generally recognised already. Johnson also points out that the IEA surveys in 1964 and 1982–3, confirm the tendency for boys to excel in the fields of algebra and geometry and for girls to do slightly better in arithmetic (Garden & Robitaille 1989, Perkins, Jones and Baker 1990). Differences apparent among 10 year olds widened further in favour of boys from 14 to school leaving age according to the IEA, NAEP, APU, and the Dutch National Assessment Program. One area where girls seem to do well in the earlier stages is computation but even this advantage for the girls is lost by school leaving age. Anomalies are apparent in the third AAP mathematics survey conducted in 1991 which curiously (according to Johnson) reported no significant gender differences on any aspect of the assessment framework for primary pupils. In secondary schools, girls were better than boys overall in whole number arithmetic and for position and movement. (AAP 1993b, Robertson and Meechan 1992).

The two most recent IAEP surveys of maths among 13 year olds (1988) and 9 and 13 year olds (in 1990) show few significant gender differences at age nine. Only in Korea and Spain do boys perform better than girls at this age. Lapointe *et al* (1992) report that by the age of 12, boys significantly outperformed girls in maths in seven out of the twenty countries participating in the survey. Murphy and Gipps report that in England there were no overall differences between boys and girls at either age although there were differences within topic areas. Foxman (1992) indicates that girls were better than boys at procedural knowledge within number and at data analysis; boys' best areas relative to girls were number concepts and measurement.

Looking at the older age group, Gipps and Murphy report that in the IEA first international study of mathematics achievement (1967), comparisons were made of maths and non-maths students in their final year of schooling in 12 countries. The average age ranged from Scotland (17.11) to Germany (19.10). Across almost all countries, boys did better than girls in both maths as well as other subjects and this superior performance was also true of the verbal problem tasks where girls might have been expected to do better. However Gipps and Murphy point out there were significant interactions between countries and sexes suggesting that environmental factors also played a part. For example, boys were more interested in maths and were more likely to be continuing their studies beyond school; two country exceptions to this were England and France where the girl school leavers showed significantly more interest in maths than the boys. Gipps and Murphy ascribe this to the bias in the sample since so few girls in these countries continue maths to pre-university level and therefore they will be more interested in the subject.

Overall differences in maths achievement were lower in co-educational schools than in single sex schools but interest in maths was significantly lower in the girls in co-ed schools compared with the single sex schools. Noticeably fewer girls than boys took maths in Belgium, Netherlands, France and England (between five and seven boys to one girl) compared with USA, Finland, Japan and Scotland (about two to one).

The IEA second international study of mathematics achievement (1989), involved 15 countries at pre-university level. Since the first study there was an improvement in gender equity occurring in most of the countries – except Japan where there was a decline in the number of girls taking maths at pre-university level. Boys consistently performed better in maths than girls at this age (except for two subtests in British Columbia). Again the authors suggest that perhaps able girls do not choose maths, but on the other hand, the girls who do choose to study maths at this level, are in fact more able.

Another feature coming out of the reviews of maths tests among 17 year olds (Hudson 1986) is that girls are handicapped by their approach to multiple choice problems in comparison to the boys. Girls were much more likely for example to use the 'don't know' option and were less willing to guess than boys.

■ 8.3 Science

The overwhelming evidence from all sources is that boys do better in science and especially in physics with smaller differences still in favour of boys in chemistry and biology. The first IEA international science survey took place from 1970–73 across twenty countries. Boys performed at a higher level than girls, especially in the physical sciences with the differences increasing from the age of 10 to pre-university – especially in Finland and Scotland (despite there apparently being more girls in Finland and more boys in Scotland at this level).

The second IEA international science survey took place from 1983–86 across twenty four countries. Again boys scored higher than girls but the overall difference was not as great as in the first survey. Gipps and Murphy point out (and the authors of the survey indicate wryly) that the authors feel the need to explain the better performance of girls – in terms of the test items.

Boys showed greatest score differentials in physics and least in biology. Keys (1987 cited in Gipps and Murphy p105) re-presented the English results showing that at A-level, boys scored significantly better than girls in biology and chemistry but there were no gender differences in the group taking physics. Keys argues that the differences in physics performance existing at age 10 and more so at 14 reflected the fact that the content is closer to boys' out of school interests and experiences than that of girls – for example girls were much less likely to have a computer at home. The third AAP survey consolidates the evidence from other studies, that boys outperform girls in P7 and S2, especially, but not only, in the physical science area (Stark *et al* 1994).

Johnson breaks down the APU Science Survey results into particular skills showing the complexity of assessment even within a subject. Girls of 11, 13 and 15 performed as well as boys when using thermometer, measuring cylinders and weighing scales but, at the age of 15, boys did better in using hand lenses and stop watches. In communicating scientific information, girls were better than boys at using bar charts and pie charts but boys were better with line graphs. I shall return to some of the potential explanations of these gender differences later but would like to conclude this part of the review with an exasperated quotation from Gipps and Murphy commenting that in studies where boys and girls conform to expectations (ie girls better on writing and boys in science), this goes unremarked:

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> What comes across in all these studies is that the authors are writing from a standpoint of assumed male superiority in maths and science, and female superiority in verbal and written skills. Any variation from this (eg girls' better performance in science) either needs explaining away (Comber and Keeves 1973) or is glossed over by focusing on boys' performance (Foxman 1992)
>
> (Gipps and Murphy 1994, p109)

8.4 Cultural factors other than gender

The discussion of studies in other countries has so far been limited to gender differences in maths, language and science but other factors which can affect performance were behind the establishment of The National Assessment of Educational Progress (NAEP) in the USA. Coleman *et al* (1966) had suggested that educational disadvantage was apparent when children entered a school system increased through school. This eventually led the (NAEP) to monitor educational achievement of American students in language, maths and science not just to oversee standards but also to monitor the extent to which equity had been achieved. The Board responsible for policy, development and implementation of appropriate assessment is required to ensure that test items are free from racial, cultural, gender or regional bias.

Gipps and Murphy quoting from Mullis *et al* (1990) indicate continuing racial/ethnic and gender performance disparities (p179ff). Females have the advantage in reading and writing but males have the advantage in maths and science as well as US history, civics and geography. Although the differences between Black and Hispanic students and their white counterparts has narrowed since 1982, there are still wide gaps. For example, in reading, maths and science there is a 3–4 year difference in the average performance of Black and Hispanic students compared with white students.

Lockheed *et al* (1985) ascribe some of these differences (among 9 and 13 year olds) and discrepancies to cultural bias in the test and differences between a pupils language and that expected by the test. These researchers were also critical of the lack of attention paid to whether or not the form and content of the science tests depended upon characteristics associated with upper-middle class White males. I shall come back to some of these points in Section 3.

8.5 Equity and higher education in the USA

Before leaving the international scene, I would like to mention briefly the impact legislation might have on achievement. The most important UK legislation was in the Sex Discrimination Act 1975 which ensures that boys and girls have the right to equal access to the curriculum. In America there have been three major federal statutes addressing gender inequalities in education since 1972 and Stromquist (1993) points out that, in addition, 31 states have at least some legislation prohibiting sex discrimination in primary and secondary education programmes. Overall these laws are both coercive and encouraging and directed at improving education for girls and women. Coercive regulations have accompanying sanctions in the form of reduced federal funds for educational institutions which do not comply; other aspects of the legislation were meant to provide financial resources and technical assistance to foster more gender-egalitarian environments in the schools.

Stromquist (*op.cit.*) shows that over a 17 year period between 1972 and 1989, women increased their participation in higher education achieving parity as a proportion of degree holders at Bachelor's and Master's level and improving their proportion from 16% to 36%

at PhD level. Stromquist also pointed out changes in first degree subjects taken by women. The greatest shifts have been in medicine and law: women attained fewer than 10% of first degrees in these subjects in 1967 but had increased their proportion to 34% and 42% respectively by 1990. Women are still under-represented in engineering subjects although even here there has been some slight movement from less than one per cent in 1971 up to 13% in 1985. Education and foreign languages continue to be dominated by women.

. Such gains were not matched in other areas concerned with equity and Stromquist concludes that gender is an area particularly vulnerable to symbolic politics and that in the USA and England, the Netherlands and Australia, 'the rhetoric surpassed funding and implementation efforts' (p399).

Summary points (8)

Various attempts have been made to compare the relative performance of girls and boys in different countries.

- Definitions and assessment are so culturally bound that it is difficult to make direct comparisons even in the relative achievement of boys and girls
- International studies confirm that girls across the world outperform boys in language throughout their school career, boys are better in sciences overall and by the time they leave school, boys outperform girls in mathematics
- There are differences in subtests and in some cases these may reflect girls' more tentative approach to tackling problems and guessing
- Research suggests complex relationships between gender, race and achievement
- Legislation facilitates equal opportunities but does not guarantee implementation of all appropriate action.

SECTION TWO

Explanations of gender differences

9 Assessment issues

In Scotland and the rest of the UK, the gap between the performance of males and females is narrowing or even being reversed in public examinations in some subjects. How are such differences, or those that have existed, been explained and are such explanations satisfactory? I have used the three hypotheses (assessment, biological and environmental based arguments) set out by Gipps and Murphy (1994) as a framework for discussion.

9.1 Assessment

Explanations of gender differences in outcome have focused on different aspects of assessment itself:

- changes in the population being assessed
- assumptions about homogeneity of variance
- potential bias
- differences relating to modes of assessment
- issues concerned with differences in how boys and girls learn or approach assessment tasks
- and the changing nature of what is being assessed.

9.2 Changing test population

An apparently simple starting point is to consider the changes in the population being tested. More young people are staying on longer at school and this group includes a higher proportion of girls who therefore might reasonably be expected to achieve more.

Gipps and Murphy (1994) summarise various explanations concerned with the changing nature of particular test populations. One argument is that there are fewer of one sex taking a subject and therefore this is a highly selected sample. For example, girls who pursue physics at Standard Grade and Higher Grade would fall into this group. Closely associated with this is the suggestion that where a subject has a large entry from one gender, only relatively high attainers from the other gender enter it. Evidence quoted earlier in this review suggests that though this may be true of girls in male dominated subjects such as physics, it is not true of boys in female dominated subjects such as home economics. Where entry patterns do seem correlated with ability – physics and mathematics for girls, and English literature for boys – Elwood (1995) suggests that maybe these students have learned how to learn and respond in ways specific to the definition, teaching and assessment of the subject. In this context, she mentions a model of physics education (Hildebrand 1995) which is designed to be gender inclusive because it covers contexts which are very relevant to real life and a wide variety of assessment modes. This initiative in Southern Australia resulted in more female entries and better female performance for the Victoria Certificate of Education.

Two other points are noted by Murphy and Gipps. The first is that the greater the representation of the sub group, the greater is the level of success achieved by it in grade terms. They point out that this contrasts with undergraduate performance where evidence suggests that females' attainment decreases in relation to males as the proportion of females increases in the total number of undergraduates.

We are left therefore with conflicting explanations which as Gipps and Murphy point out 'indicate our limited understanding of the factors causing these shifting, differential patterns in sub-group performance' (p.258).

9.3 Homogeneity of variance?

A gem in this debate is an early review by Ellis (1894) who concluded from psychological, medical and anthropometric data that males were more intellectually variable than females. This conclusion was based on evidence that males were over-represented in institutions for the 'retarded' and among the 'eminent'. Ellis assumed therefore that greater male variability was innate. Off to a grand start the debate has stretched over a hundred years with early psychologists arguing the case: Thorndike claiming that women's lesser achievements indicated that there were few intellectually gifted women and Francis Galton deploying a peculiar logic in his '*Heredity Genius* ' 'proving' that intelligence was inherited because such a small group of families managed to produce so many members (all male) of the elite.

In a variety of papers from 1913–1922, Hollingworth was severely critical of the greater male variability hypothesis applied to cognitive abilities. In a review of the literature, McNemar and Terman (1934) found no consistent evidence of greater male variability except among college students (recognised as not being a representative sample) and on some standardised tests. Interest in the issue revived in the 1970s with Jensen's data-based review of sex differences in variability in intelligence. Jensen found greater IQ variances among males than females although Feingold (1992) challenges these findings on the grounds that it covers too narrow a selection of studies and does not attend to sex differences in specific cognitive abilities. Maccoby and Jacklin (1974) concluded that not only did males outperform females on tests of mathematical and spatial ability, and females outperformed males on verbal tests; they also found that males were more variable that women in mathematical and spatial abilities but that the sexes were equally variable in verbal ability.

Much contemporary research on sex differences in intellectual abilities has focused on male-female differences in average performance, implicitly assuming homogeneity of variance. Feingold (1992) looked at variability from the national (US) norm in several standardised test batteries (Differential Aptitude Tests) in grades 8 (14 years) through 12 (18 years). He found that males were consistently more variable than females in a range of areas: quantitative reasoning, spatial visualisation, spelling and general knowledge but not in verbal ability. On the whole males were more variable than females in test performance.

A feminist response by Nel Noddings (1992) to Feingold's accounts of the variability hypothesis describes it as 'pernicious' since it was perceived (by its authors) as accounting for why more men than women were eminent. Others have offered alternative explanations such as the male basis for selection, the constituency who made the selections and finally Noddings questions why it has been seen as necessary to pursue research that has had such an unfortunate history.

The research studies reviewed in this paper suggest there is more variability in examination outcomes for males than for females but it is complicated by different patterns being apparent in various parts of the UK.

9.4 Validity and bias

A second band of issues are around validity and bias in tests, test procedures or even in examiners' reactions to candidates. The major concern about bias is in the nature of what is being assessed.

Gender bias in examinations and tests

At this point I would like to revert to problems of definitions. Stobart *et al* (1992a) in reviewing some British work on assessment and equal opportunities observed that much research assumes an agreed meaning in terms of absence of bias but tends to duck the issue of whether one is looking for equality of access or equality of outcomes. Equal outcomes provide an inappropriate goal for Gipps and Murphy (1994) since different groups may indeed have different qualities and abilities and certainly experiences and they give as an example one ethnic minority group who may work exceedingly diligently and achieve good results. Should these be engineered to level scores with other groups? Rather than use equal outcomes, they suggest that:

> The concept of equity in assessment implies that assessment practice and interpretation of results are fair and just for all groups.
>
> (p18)

It is very difficult to establish that a test or examination avoids bias and does not discriminate against certain groups. When a group (of boys for example) performs less well on a test (than a group of girls) is this due to real differences in performance for a variety of reasons or because the examination itself is biased in some way (i.e. that boys really are less able and not that tests are biased against them)? The question is whether differential performance on a test is the result of real differences in performance due to a variety of possible causes or bias in the assessment. It would be extremely difficult to sort this out but emphasis, quite rightly, has been put on removing different forms of gender bias *inter alia* from examinations and tests.

Bias is present when a test item has meanings or implications for a relevant sub-group of test takers that are different from the meanings or implications for the remainder of the test takers (Cole and Moss 1989 p203). What forms might such discrimination take? It is alleged that the NAEP reading assessments were biased in range of vocabulary, syntax and the idioms used (Tierney and Lapp 1979).

In the UK, over the last twenty five years especially, quite a lot of work has been done to check on potential bias which could result in discrimination against girls, and more recently against boys. For example, in 1987 the Fawcett Society looked at gender roles as reflected in a range of exam papers from English and Welsh Examination Boards and found 7 types of discrimination:

- the overall effect of a paper can be biased because reference is made predominantly to one sex
- the presentation of men and women in the papers is stereotyped: men are admirable, women frivolous
- the questions are about subjects of interest only to boys

- the assumption that people are male and so male is the genotype; girls and feminine pronouns go into brackets if they appear at all
- the authors of texts studied are almost exclusively male
- passages chosen for criticism and comment have a strong male bias
- an opportunity to mention eminent women has been missed.

More recent Scottish work indicates that possible bias has been taken very seriously by the Scottish Examinations Board who conducted an in-house study of potential gender bias in the wording of questions and in marking:

> In relation to gender, the aim of SEB Principal Examiners and question paper setters is to present candidates with examinations which are gender-free or gender-balanced, and which avoid gender-stereotyping. The extension of examining to virtually the whole age cohort through the introduction of Standard Grade has made this task more demanding, given the need to contextualise questions in the interests of validity, of language accessibility and candidate motivation.
>
> (SEB Research Bulletin 3 1995, p3)

Checking on the effectiveness of this intent, Ganson and De Luca (1995) scrutinised all 1993 Standard Grade examination papers and concluded that overall the vast majority of questions were gender-balanced and avoided stereotyping. Most subjects maintained a gender free approach to language and a gender balance and non-stereotyped roles where males and females were portrayed. There were subject differences. For example in modern languages, English and French paper setters tried to choose passages of text attractive to both boys and girls but the German and Italian papers were more stereotyped in their portrayal of gender. In science, there was a tendency to provide a gender related context in questions with girls referred to in a home context (eg central heating, electric kettle) and boys in 'real science ' contexts (eg light intensity, metals conducting electricity). In Office and Information Studies at Foundation level there was also implied stereotyping in illustrations where the text and/or the illustration suggested the male was the person in authority in an office setting. (Incidentally I have come across no published research concerning potential bias in SCOTVEC modules either in terms of test items or in marker bias.)

Overall, these are minimal, if still undesirable, negative features of examination papers and certainly advances have been made in the use of most curriculum and examination texts to avoid bias. The majority of publishers, teachers and examiners are aware of the dangers of unintentional bias that can discriminate against certain groups. Removing sexist material, for example, does not mean that what remains may not be biased. It is probably impossible to avoid incurring criticism from every interest group and if such material could be produced, it would probably be so anodyne that everyone would lack motivation. What is important is to ensure that the diet of assessment does not over-represent certain interest groups and overlook others.

In the USA where there has been a more vigorous approach to equity, there is a 'Code of Fair Testing Practices in Education' which requires test agencies to indicate for all tests and assessments 'the nature of the evidence obtained concerning the appropriateness of each test for groups of different racial, ethnic or linguistic backgrounds'. This has naturally been difficult to monitor or enforce (Gipps and Murphy 1994) given the scale of testing

in America. What is recommended is 'The Golden Rule Strategy' as applied to different ethnic groups. Preference should be given in test construction to items that show smaller differences in the performance of black and white students: 'among questions of equal difficulty and validity in each content area, questions which display the least differences in passing rates between majority and minority test takers should be used first'.

Another question raised by Ganson and De Luca (1995) is whether it is the function of examinations to reflect society or to be an instrument of change within society? An examining body can reasonably be expected to reflect good practice and abide by the law in regards to equal opportunities. However, is there perhaps a danger in assuming that males and females behave in similar ways or have identical abilities or interests?

Bias in markers

In 1992, SEB carried out an internal inquiry into any marker bias in relation to gender, ethnic origin of candidates and perceived 'academic status of schools' in Standard Grade English and history. Scripts were copied to male and female markers and apparently came from variety of candidates – female of Asian origin from a 'high status' school, male candidate of longer standing Scottish origin from a 'low status' school and so on. Results suggested that markers were largely unaffected by candidate's gender, ethnic origin, and the status of the candidate's presenting centre. Recently there has been a PE subject panel investigation into whether the assessment of practical performance is equally fair to both boys and girls since this is the only subject in which girls are consistently poorer than boys (Ganson and De Luca 1995) but I am unaware of the outcome of this scrutiny.

The Northern Ireland Schools Examinations and Assessment Council marks scripts without candidate names and school or college names being used which gets over potential bias suggested by Fitz-Gibbon from knowledge of the candidates name or school (D'Arcy 1994).

Some assessment (eg course work, oral examinations, assessment of practical performance) requires the marker to meet the candidates. Sometimes this will be simply for the assessment process but in the case of teacher assessed work, student and marker would know each other for a longer period. It is assumed that the integrity and experience of the marker would not allow the appearance of a candidate to sway judgement. However this may be ignoring an important dimension of bias. In a review of studies concerned with expectations, impressions and judgements of physically attractive students, Ritts and colleagues (1992) concluded that physically attractive students are judged more favourably by teachers in a number of dimensions including intelligence, academic potential, grades and various social skills. Among the studies carried out across all educational levels – elementary pupils, high school students and college female students – in the USA, male and female physically attractive students usually received higher grades and/or higher attainment scores on standardised tests than unattractive students. The reviewers note that if physically attractive individuals are treated differently and do obtain better grades throughout their school careers, the effects would be likely to continue into post school education (p.418). There does not seem to be any published Scottish research into attractiveness but Newstead and Dennis (1990) did not find – as in other studies – that females are marked less extremely than males.

■ 9.5 Mode of assessment

As Janette Elwood (1995) says, assessment techniques at A-level have remained largely unchanged since inception. Course work is kept to a minimum and there may be multiple

choice papers, orals and practicals used in certain subjects. The situation is similar for Higher Grade. English, for example, includes a portfolio and biology includes laboratory tasks which are then assessed by a traditional examination. There is much more variety in the mode of assessment in Standard Grade, GCSEs, O-level and vocational qualifications recognised by SCOTVEC.

Most research studies affirm that the mode of assessment is a factor in differential performance of boys and girls (eg Stobart *et al* 1992b; Murphy 1982; Newbould and Scanlon 1981; Bolger and Kellaghan 1990; Harding 1980). These studies show that boys tend to be favoured by multiple choice questions and girls by essays and course work. Elwood's analysis of 1994 maths and English results in GCSE and Trew and Turner (1994) make rare challenges to this conclusion.

Murphy (1980) reviewed GCE O and A level entry statistics 1951–77 and found that by 1977, twice as many girls as boys were entering for A levels in English and French whereas in 1951 the numbers had been similar. By 1977 females achieved higher pass mark in almost every subject at O-level and A-level but Gipps and Murphy summarised various studies which show that performance of boys improves relative to girls when a multiple choice test is used. Harding (1980) similarly found that in science, multiple choice items favour boys and essay type questions girls.

In looking at performance on standardised tests in Northern Ireland, Trew and Turner (1994) did not reach clear cut findings when examining boys and girls relative performance on objective tests necessary for the Northern Ireland Civil Service. They found that experience of A-level science can apparently affect more than the A-level examination result in that subject. In the sixth form, boys had superior performances on the tests but when subject choice was statistically controlled the differences no longer occurred. Over 70% of the boys were studying science but only fewer than 40% of the girls in the same schools took science A-levels. It seems that girls who are more likely to take arts A-levels are disadvantaged in their lack of experience of multiple choice formats and the type of problems used in objective tests.

The outcomes of Trew and Turner's research agree with other studies across a wide range of subjects that girls have an advantage on course work and essay-type questions whereas boys have an advantage on multiple choice tests. An exception is the more detailed analysis showing that girls' success in GCSE is not due only to their course work. Elwood (1995) calculated that the weighting of the course work means that it is generally performance on the examination papers that determines the final award. Reviewing the weighting of different components in A-level English literature and physics outcomes, Elwood found that although girls do slightly better at course work than boys, it is the girls' examination papers which contributes most to their overall grades. Moreover this analysis showed that the most important contributions to the overall grade were the multiple choice paper (which contributed more for girls than for boys) and the short item response paper. Elwood (1995) notes:

> There appears to be some dissonance between the contribution that course work makes to the overall performance of males and females and its role within the syllabus as perceived by teachers and students.
>
> (Elwood 1995, p.10)

Elwood's analysis underlines the importance of explanations about the poorer performance of girls in multiple choice questions. Most ascribe this aspect of gender differences to girls being less willing to guess and preferring to make omissions and only respond where they

are confident (Hanna 1986; Boger and Kellagahan 1990; Bradberry 1989). Gipps and Murphy refer to Adams' (1986) and Anderson's (1989) work in this connection. Adams recognised the importance of confidence for success in levels of performance in the Australian Scholastic Aptitude Test (for year 12 students) – females had significantly lower confidence levels than males. Anderson (1989) found that female undergraduates performed consistently less well than males on four different types of maths test and attributed this partly to their lack of confidence and being less willing to guess than males. Similarly Sherman (1974) argued in relation to NAEP that the self confidence of males means that they tackle more items whereas females either give no response or 'don't know. Boys are more willing to take risks and to respond well in novel situations (Kimball 1989).

Going back to Trew and Turner's research, it may well be that the teaching methods used in science encourage more adventurous approaches to learning and to assessment, enhancing self confidence and encouraging risk taking. If this is the case, as fewer girls take science, this aspect of their intellectual development is being relatively neglected. Certainly the relative experience and expectations of girls and boys in terms of their abilities and familiarity with the method of assessment has been seen by Stobart *et al* (1992b) as contributing to differential results in GCSE.

This group of researchers working at the Institute of Education, London are trying to explain gender differences in A-level outcomes. In particular they are looking at the relative contributions of course work and examinations to gender-related differences in A-level; whether there are areas of content which benefit one group more than another; and if certain contexts, tasks and response modes used at A-level benefit one gender more than another.

One other study to be mentioned in this discussion of gender differences in course work is the work done by Cresswell (1990) who found school differences in gender effect. In schools where the gap between girls' and boys' performance on course work was the largest, the boys' lead on the written exam paper was small. Where the boys outperformed the girls on the exam paper to the greatest extent was where they had achieved a higher mean than girls on course work. In other words, it seems that boys carry their course work advantage to examinations whereas girls do not.

9.6 Are there male/female approaches to learning and assessment?

The ways in which boys and girls perform on different types of test is likely to reflect their learning experiences. On the positive side, we can argue that the content, method and language of assessment should be consistent with preceding learning and teaching experiences (assuming the examination is in effect assessing schooling). Changing the structure of a test could change the results for groups of boys and girls unless they have equal access to different styles of learning and teaching which include techniques to be used in the test. It is also incumbent on those who design public examinations to ensure that a range of assessment techniques are used so that there is no bias against one particular group of candidates.

Gipps and Murphy (1994) underline the need to recognise that changes in performance might reflect changes in the values and practices of assessment. They quote the example of the introduction of course-work into 16+ examinations because it provided opportunities to measure valued aspects of students' achievement that traditional measures could not

cater for. Relatively little is known about pupils' learning styles; typologies of teaching styles are more common. It has been suggested that different learning styles may result in students (eg from different ethnic and racial backgrounds): not responding to certain items; following a different track from that assumed by an assessor; providing an alternative, though adequate, solution; expressing answers in ways which are devalued and attributed lower scores by assessors. Some of these are the very attributes recognised as indicators of creativity but which are 'taught out' of pupils by the requirement to prepare them for public examinations. If girls do tend to conform, to be 'good pupils' they will have learned not to take risks, and to answer questions only when they are confident of being correct.

Attitude and attainment

Johnson (1995) in her summary of large scale surveys, shows gender differences in attitudes towards subjects and towards out of school activities reported by boys and girls. These are broadly associated with the areas in which boys and girls are generally and respectively more successful although correlations are low in some instances between attitudes and attainment.

Thus girls have a more positive attitude to reading and to writing than boys at all ages. They claim to read more and the content of what they say they read is again related to their achievements with girls preferring fiction and boys non-fiction. Johnson mentions some of the work based on the APU work (Gorman *et al* 1987) which shows that with the exception of reading comics, boys were less enthusiastic than girls about reading fiction. In that study and ones related to the Dutch National Assessment Program in Education (Zwarts 1990, Sijtstra 1992), girls claimed to spend more time reading out of school than boys did. Correlation between attitudes and attainment in reading comprehension were positive, though low, between reported data in the IEA survey (Thorndike 1973) the APU language test (Gorman *et al* 1987) and in the Canadian national assessment between writing test performance and personal reading practices (SAIP).

On the whole, boys have more positive attitudes to maths and science than do girls although only work based on the APU data is identified by Johnson as clearly relating attitude to attainment. Johnson states that in science, strong gender-related differences emerged in attitudes, interests and career aspiration, in a direction consistent with differences in boys' and girls' APU test performances (eg Schofield *et al* 1987, Archenhold *et al* 1988, Johnson 1987).

D'Arcy (1994) Turner *et al* (1990) found different approaches to learning mathematics between third form boys and girls in secondary education in Northern Ireland. Boys seemed to depend less on teachers' explanations for their understanding and were more likely to devise their own methods and short cuts. The researchers concluded that already boys were showing some of the characteristics of adult mathematicians whereas the girls were not.

■ 9.7 Are the same features being assessed over time?

This review has been considering changes in attainment over time but of course it cannot be a comparison of like with like. That is a substantive problem with any longitudinal educational study even at the most elementary level. Take for example the problems in assessing trends in reading standards where vocabulary, idiom and social context change so much over time. Tests used before 1960 contained the word 'mannequin' which in today's terms would be 'model'. The books used in learning to read and those used as texts in secondary school have changed dramatically even within the last twenty years,

partly under the influence of central curriculum changes but also in attempts to meet the needs and interests of all students. Recognition of the inappropriateness of some of the materials and curriculum to which boys and girls were exposed led to changes which were intended, and probably have, enhanced girls' performance in subjects where they were considered to be underachieving.

What we are looking at here are not just changes in assessment practices, which contribute to differential gender performance, but also 'changes in approach to how subjects are defined and what constitutes "success" in them (Gipps and Murphy p259). Some of these changes will have been brought about by educational reforms in Scotland such as 5–14, Standard Grade and the expansion of Scottish Vocational Qualifications. Relevant to this point about definitions of subjects are fairly recent controversies in England concerned with assessment in empathy in history and the decision to assess spelling formally in all subjects at GCSE.

Even so the range of assessments may still be too narrow. Nel Noddings (1992) queries the range of measures being deployed in the USA:

> Even if the range of measures is strictly limited to the intellectual, there are capacities valued by women that do not appear in the current standard battery: listening, oral and written text interpretation, interpersonal reasoning, production of constructive (non adversarial) responses, resistance to the use of verbal or physical violence as a mode of response, interrupt ability (the capacity to carry on an intellectual task through a series of interruptions) and managing several tasks simultaneously. These are examples of intellectual tasks that might be considered.
>
> (Noddings 1992, p88)

I finish this discussion of explanations about gender differences in attainment based on features concerned with assessment by listing the influential sources of invalidity in assessment identified by Gipps and Murphy in their review of research in this area:

Influential sources of invalidity in assessment:

- factors within the assessment itself (eg item format and response mode)
- the effect of the gender and specialism of the marker
- examiners' constructions of the subject and what counts as achievement in it
- maturational differences between the genders
- school effects (especially for minority ethnic groups)
- ability level of selected 18+ samples
- racism in schools and outside it
- tutorial style and pressure of examinations
- motivation and self esteem
- expectations from self and society.

(Gipps and Murphy 1994, p259)

As well as assessment based explanations, this list covers factors relevant to biological and environmentally based rationales and I move on to these now.

Summary points (9)

- Explanations have focused on different aspects of assessment itself. One of the most important areas is the changing nature of what is being assessed
- Fruitful areas for further research are likely to be in potential bias in tests and among the choice of assessors and the criteria they use specially in relation to vocational qualifications
- Boys and girls vary in their approach to assessment tasks and in their performance in course work and examinations. Their previous learning experiences and self confidence are likely to be important factors.

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10 Biological explanations

The basic assumption behind biological explanations of why girls perform better than boys in examinations has traditionally been that boys mature more slowly than girls. The sad effects of the belief were prolonged in Northern Ireland where despite girls' superior performance, grammar school places were allocated to an equal proportion of boys and girls until as late as 1988 and girls who had obtained higher marks than some of the boys in the 11–plus, were nevertheless not allowed to go to grammar school. Montgomery (1994) showed that this practice was only discontinued after litigation by the Equal Opportunities Commission in Northern Ireland.

Although the nature-nurture debate consumed much of the energies of social scientists in the first half of this century, it now seems a rather sterile exercise until the unlikely time when there is every confidence that all environmental benefits have been maximised for all learners. I shall therefore only refer to two, albeit substantial, research reviews pertinent to biological hypotheses as the basis for gender differences in attainment.

Friedman (1989) completed a meta-analysis of studies on sex differences in mathematical tasks, an area which she describes as one of the most controversial in recent behavioural research. Most studies of young children up to the age of 10 reveal either no differences or that any differences favour females (eg Callaghan and Clements 1984; Dossey *et al* 1988). An interesting exception are studies of 'gifted' children in which males perform better than females. These include research by Benbow and Stanley (1982) who favour the biological argument partly because they also found a high rate of left-handedness and auto-immune disorders in their mathematically gifted population.

Although sex differences in mathematical attainment have been ascribed to differential courses (eg Pallas and Alexander 1983) in the general population, experience of different courses does not account for all of the sex differences in mathematical tasks (Friedman 1987, Ramist and Arbeiter 1986). A 'Women in Mathematics' Survey carried out in 1978 by the Education Commission of the United States, found many correlations between mathematics attainment and sociological and attitudinal variables both for 13 year olds and 18 year olds (Armstrong 1985). This indicated that environmental variables do seem to have an impact upon mathematical attainment. This meta-analysis focused on 98 studies concerned with the years in which patterns of female attainment in mathematics changed i.e. between elementary and secondary school. Males and females are often assumed to have different strengths in mathematics with girls reputedly doing well in number and boys in problem solving and applications. (This certainly corresponds with findings in the British studies mentioned elsewhere in this review). Comparing results of Friedman's meta-analysis with that of Maccoby and Jacklin (1974), Friedman concludes that the sex difference in favour of males is decreasing over time. This is put forward as

evidence to support environmental explanations of sex differences since only environmental influences (and not biological ones) would have adjusted in the 25 years between the studies. Lynne Friedman gleefully states:

> A substantial amount of concrete evidence has been brought to bear against the tenet that women are irreversibly inferior in mathematical capabilities.
>
> (Friedman 1989, p206)

Her second conclusion is that whatever the relative contribution of heredity and environment, the average sex difference in mathematics is now very small.

Alison Kelly (in *Girls and Science* 1978) examined sex differences in the 14 year old population in the first IEA science survey to be carried out in the developed countries. Boys achieved better than girls in science. Differences were consistently larger in physics and smaller in biology with chemistry intermediate – sex differences were therefore more characteristic of a branch of a science than of a country. She explored three hypotheses (culture, school and attitude) each of which proved unsatisfactory in accounting for differences. As reported in Gipps and Murphy:

- *the cultural hypothesis* : girls don't do as well as boys because society does not expect it;

  but there is insufficient evidence of differences across countries with different cultural expectations so the hypothesis is unproven

- *school hypothesis* : schools present science in ways more suited to boys than girls;

  but girls did not achieve better results with women teachers or in single sex schools (once selection factors allowed for) or have a more favourable attitude towards in single sex schools

- *attitude hypothesis* : girls have less favourable attitudes to science than boys and pupils with more favourable attitudes achieved better than pupils with less favourable attitudes;

  but boys with positive attitudes scored higher than girls in the same country with positive attitudes.

Kelly (1978), and Murphy (1990) both suggest the importance of out of school learning especially for physics. Kelly advances hypotheses based on a cognitive-developmental theory of the acquisition of sex-role stereotypes: science is seen as a masculine activity and is rejected by girls striving to attain a feminine identity whereas boys try to adopt scientific ways in their play activities and hobbies, thus gaining an initial lead over girls in science achievement (Gipps and Murphy *op.cit.* p.109).

Biological hypotheses have in the past been used to explain the lower attainment of other groups especially racial and ethnic groups. However gaps in performance of different racial and ethnic groups narrow with appropriate ameliorating strategies such as have been apparent in relation to girls and science.

Sammons (1995) noted considerable differences between Asian minority ethnic groups – Indian, Bangladeshi, and Pakistani (Nuttall 1990) and Asian pupils out-perform their white peers in London schools at 16+. Overall, African-Caribbean pupils achieve

lower average exam scores than either white pupils or pupils from other ethnic or racial backgrounds but what concerns us here is how girls do within each group in comparison to the boys. In a study of 62 young African-Caribbean women and their peers the Black girls did best in their final examinations. Only two percent left school without any qualification but 20% of Black boys had no graded result and did worse out of all the groups. 93% of Black girls had an average performance of between one and four passes compared to 80% of the Black boys and 87% of the white girls and boys (Mirza, 1992). These figures are consistent with other studies undertaken by ILEA (1987). Mirza argues that, despite these results, gender issues have been marginalised as a consequence of the political undercurrents that have shaped research on race and education.

Summary points (10)

- Biological explanations for gender differences in attainment are unprofitable until there is confidence that all environmental benefits have been maximised for boys and girls in all ethnic and socio-economic groups.

11 Environmental theories

The final area to examine is how environmental influences affect gender and attainment. The section begins by considering the first influences on a child's learning, the home and the context in which the family operates. I then move on to consider aspects of school likely to influence how children approach learning and assessment. Finally there is brief reference to educational policies within which educational institutions operate.

11.1 Home (and society)

Attainment in education is influenced by factors within the home, in terms of the composition of families, their occupations and financial situations, and their ethnic origins. The way the family lives and attitudes towards education are also important. These influences on an individual cannot be separated out but interact.

Rather than a single factor being important, it is the cumulative disadvantage accrued from several factors which affects pupils' school attainments according to the work of Sammons (1983) and colleagues at the Institute of Education, London using multilevel analysis. They identify seven factors concerning pupils' backgrounds which can be used to predict the statistically increased risk of low attainment at age 11:

- eligibility for free school meals (indicator of poverty)
- large family size
- one parent family
- semi-skilled or unskilled manual parental occupation or unemployment
- children's behaviour
- fluency in English (incomplete)
- ethnic family background.

Only 11% of pupils not affected by any of these factors were in the lowest verbal reasoning band at age 11 compared with nearly 92% of those affected by all seven. (Sammons 1983). Such background factors are likely to persist through secondary school, and as has already been shown, attainment at 11 is related to subsequent GCSE performance with more progress being made by girls and some ethnic minority groups (although absolute scores may not be superior).

Although these factors are not independent of each other, overall poverty is the most obvious key feature: Sammons (1995) quotes Croniger (1993) as showing the significant impact of poverty on reading and maths attainment across gender and ethnic groups. Earlier studies had also shown that measures of low income (eg unemployment, eligibility for free school meals, receipt of clothing grants) were powerful predictors of academic attainment (Douglas 1964, Mortimore and Blackstone 1982). Sammons additionally highlights the importance of taking socio-economic background into account in any analysis of ethnic differences. Mortimore and Blackstone (1982) pinpoint the disadvantage

(in educational attainment terms) of living in a large family. Paterson (1992) in discussing the low attainment on average of pupils from one parent families is uncertain whether it can be ascribed to there only being one parent or to the associated low pay and working conditions of many single mothers.

While these studies consistently point to the relationship between poor home conditions and educational attainment, Paterson is curious about the similar patterns in the attainment of boys and girls in all social groups. He asks,

> Why is a pupil's own gender not relevant to the way in which the socio-economic status of their parents, or their peers, or their neighbourhood influences their educational experience?
>
> (Paterson 1992, p13)

Well perhaps in subtle ways it is. In the longitudinal study, the 'School Matters' (Sammons 1995) girls in a cohort of inner London pupils outperformed boys in traditional tests of reading and (by the age 10) mathematics and they also made greater gains overall during secondary schooling in terms of total GCSE performance in 1989. One explanation is that differences on entry to school can be ascribed to home influences. Improvements in attainment are due to school influence. As these pupils were all from comparable socio-economic backgrounds, Sammons concluded that mathematics attainment is less susceptible than reading to home influences and that background factors become relatively less important in determining maths attainment as children progress through school. This seems the case for girls who tend to be conscientious pupils.

McEwan, Curry and Watson (1986) note that parental attitudes in Northern Ireland were important influences on girls' choices and in particular there is a strong social-class influence on girls' choice of A-level subjects making it difficult for girls from a working class background to overcome the 'masculine' view of science.

Douglas (1964) and the Plowden Report (1967) both drew attention to the impact of home life on school learning. The latter found positive correlations between children's achievement and home factors. Parental support (time spent with children at home and helping children with their school work) and the assessed level of literacy in the home were both factors contributing to performance in the later primary school years.

Parents' own level of education is important as indicated earlier (Paterson 1992). Again we need to ask if it has a different effect on boys and girls. The studies reviewed so far have not distinguished between the effects of parental education on males and females and there does not seem to be evidence of this kind about the Scottish context in particular. Looking in detail at the family backgrounds of different ethnic groups in the USA, Rumberger (1983) found that the higher the mother's level of education, the more likely black and white females and black males were to stay in school. However mother's level of education had little effect on white males or Hispanic youths. Rumberger suggested that mothers are important educational role models for black youths and white females, that fathers are more important for white males, and that for Hispanic youths, other factors (especially economic ones) determine whether or not they continue with their education.

Rumberger's study underlines the point made at the beginning of this discussion of home and societal influences on attainment: that the factors are cumulative for each individual and it is not sufficient to address only one or two to produce satisfactory comprehensive explanations for any gender differences. For example in establishing

poverty as a key feature, Croniger (1993) shows significant impact of poverty on reading and maths attainment across gender and ethnic groups.

Grant and Sleeter (1986) reviewed 71 articles selected from four of the top American education journals, spanning ten years. Each addressed equity issues and the reviewers' analysis focused on the extent to which issues of race, class and gender were integrated. Most treated racial, class and gender groups as if they were homogeneous and as if individuals are only members of one group at a time. Eighteen articles in the sample focused on gender and the majority ignored both race and class. For example in several of the survey studies comparing male and female students or teachers, there was no indication of the race or social class of the participants. Haertel *et al* (1981) using evidence from NAEP found middle class boys had higher achievement motivation than middle class girls in maths and science, but this pattern did not hold for lower class girls and boys. They also found an interaction between race and gender in some aspects of science learning. Grant and Sleeter argue that attending to only one dimension – race or gender or class – not only oversimplifies behavioural analysis it may also contribute to perpetuation of gender and class biases.

There have been important studies in relation to take up of higher education by gender and different ethnic groups in England (but not Scotland), and their results suggest that further work might well focus on why some well qualified males and females from certain ethnic groups are not applying for further and higher education or are being unsuccessful in their applications. Thomas (1994) showed that, over 3 years, no ethnic group performed worse at school than the white classification group. Results from the work of Desmond Nuttall and his colleagues (1992) went further: students from all minority ethnic groups in inner London had consistently outperformed white students – sometimes massively so in O-level and GCSE performances.

Yet at the same time there was a general belief that ethnic minorities were under-represented in HE (Modood 1993). In fact they are as a whole over-represented in relation to their population size in application and admissions to HE. As a result of a celebrated case in which the Council for Racial Equality successfully demonstrated racial discrimination in admissions to St George's Medical School, UCCA and PCAS the two higher education clearance systems began to collect data on ethnic origins as well as gender (inter alia). There are participation and gender differences within ethnic groups; for example the Bangladeshi community is under-represented (Modood and Shiner 1994) and the position of women in that community may be worse. Individual aspiration is an important feature. Fuller (1980) found that a sample of lower-class black girls in London distanced themselves from black boys and white students because of their high aspirations for themselves, their concern about not wanting their peers to ridicule them or try to hold them back, and their desire not to be viewed as acquiescing to whites.

Interestingly, white women were the least successful applicants for polytechnic in 1990 and 1991 according to PCAS figures for those years. Only just over a third of applicants were admitted compared with nearly half of Black-Caribbean male applicants and nearly as many men with an Indian sub-continent background. As Modood (1993) says, perhaps these polytechnic admission patterns were reversed in universities. These findings need to be seen in the context of changes in admissions systems for higher education after the abolition of the binary divide. Now there is a single clearing house for all higher education, it will be interesting to see the ethnic and gender groupings of successful applicants.

A final comment about home and societal factors in relation to gender and attainment. Sammons (1995) points out that the British sociological/educational research tradition has concentrated on factors associated with poor educational attainment but overall less attention has been paid to factors associated with high attainment. High social class, gender, greater level of parental educational experience and qualifications, cultural capital in the home, and membership of certain ethnic groups have all been found to be associated with higher educational attainment and, except for gender, participation in higher education (Sammons *et al* 1985, Mortimore *et al* 1988, *Nutter et al* 1989). A study of high achieving women in education in the UK (Powney and Weiner 1992) found that women's success was due to a variety of strategies, with some who had made deliberate career choices and others who had drifted for part of their professional lives or seized opportunities when they came. It was noticeable in this study that those women in the sample from a higher social class had more and better opportunities offered to them than those who had worked their way up from a lower socio-economic group.

11.2 School

> Schools will make more of a difference when testing skills primarily learnt at school. The differences between schools are thus always greater for subjects like maths than for subjects like tuition in one's own language.
>
> (Scheerens 1992, p70)

Scheerens, like Sammons mentioned earlier in this report thus draws attention to the impact of school on gender and attainment. Differences may be apparent in different types of school, in the motivation encouraged by teachers, the type of curriculum and who has access to it. These all contribute to the overall ethos of the school.

Type of school

The nature of the school attended by boys and girls must be a factor of primary concern to this review. Whether or not a school is co-educational has long been perceived as a potential cause for differential performance between boys and girls. Harding (1980) puts responsibility firmly on schools as the root for under-achievement of women in science-related careers at all levels, especially technological fields. Harding's own investigation into Nuffield O-level sciences and more conventional science courses in 1974 showed that girls in single sex schools gained higher percentage passes than girls in mixed schools – the differences were significant in physics and conventional biology examinations. A DES survey (1975), at about the same time, indicated that girls offered physics in years 4 and 5 were one and a half times more likely to choose it in a girls-only school than in a co-educational school. Boys in boys' schools also attained higher percentage passes than boys in mixed schools but not significantly so. Harding and Craig (1978 – cited in Gipps & Murphy 1994) – found that although overall boys and girls had comparable performances in physics, chemistry and biology examinations at age 16:

- boys from mixed schools were more successful than girls from mixed schools
- girls from single sex schools did better than peers in mixed schools.

Halsey in a radio broadcast earlier this year re-appraised national policy and concluded that there has been a lack of serious attention by government to sex and education. In this programme, *Clever Girls, Lost Boys*, he asserted that it is necessary to reset targets for boys and girls which brings out their best qualities. The benefits of single sex schools are being reviewed not just for the benefit of girls but also for boys who (according to Halsey)

currently have few heroic role models and have to create their own heroic situations – sometimes in anti-social ways. Schools such as Sheffield High in Essex are introducing partial segregation to enable boys and girls to study in separate groups sometimes. In the Scottish context this is interesting information since almost all Scottish schools in the public sector are co-educational.

Earlier, reference was made to Montgomery's paper (1994) showing that in Northern Ireland girls outperform boys at all examination levels regardless of whether secondary or grammar school, Protestant or Catholic. However, using information from Cormack *et al* (1992), she shows that religion (which is also associated with socio-economic factors) is a major factor in attainment in compulsory education. Protestant pupils in Northern Ireland are more likely than Catholics to leave school with three or more A-levels and are less likely to leave school with no formal qualification. Nevertheless, within each religious group, girls have higher attainment.

Motivation, learning and attainment

Johnson (1995) teases out the large scale performance survey findings relevant to motivation and differential attainment for boys and girls. She points out that teachers set enjoyment of a subject as one of their goals:

> Few would argue against the notion that an interested and motivated student is easier to teach and more likely to make learning progress than another who is less inclined to put effort into the learning experience.
>
> (Johnson 1995, p6)

Johnson cites studies based on APU and AAP science surveys (Russell *et al* 1988 and Stark *et al* 1994) as consistently showing that enjoyment of science-based activities is among the highest of teachers' goals. Teachers have had different expectations of male and female students. For example, Dossey *et al* (1988) refer to the different treatments and opportunities for male and female students and how teachers challenge boys and not girls during questioning sessions; and Turner *et al* (1995) quote from the GTC's policy statement on gender:

> Responding to individual pupils in ways which stereotype them eg expecting boys to be mischievous or girls to be passive, is often quite unconscious. It can however lead to a disproportionate time being devoted to clamorous boys while the quieter non troublesome girls are disregarded.
>
> (Turner *et al* 1995, p25)

As already mentioned in the introduction, the Equal Opportunities Commission is concerned with gender discrimination and lists direct and indirect discriminatory practices which could be unlawful. In 1991, the leaflet 'Equal Opportunities in Schools' openly addressed issues such as teachers' different expectations of girls and boys, the amount of teacher attention and use of resources and verbal and physical harassment of girls by boys. The General Teaching Council (1991) have also produced information and guidelines on strategies consistent with equity in schools and colleges.

Teacher bias can unwittingly affect how pupils develop a gendered view of subjects even from an early age. It is worth mentioning here, evidence of the hidden curriculum from Northern Ireland that shows that from early primary school, pupils are being socialised into stereotypical gender roles and behaviour through reading materials, differential access to toys and play material and pupil-teacher interaction (Morgan 1987).

Cohen (1986) has also suggested that not only have children already firmly developed learning styles by the time they start school but that some of these styles are incompatible with the demands of various subjects. When children enter secondary school, they are likely to be firmly established in gender type activities, socialising with peers of their own sex, participating in different sports and following different out of school activities.

Montgomery mentions a pertinent study carried out by Reid and Kramer (1990). They explored gender differences in pupils' perceptions and experiences of Craft, Design and Technology (CDT). Overall boys and girls agreed that teachers spent more time with boys and offered them more opportunities to work with tools and equipment. Of the girls who had chosen to study CDT, 62% indicated that they did not feel fully accepted in the classroom despite teachers' own beliefs that they had treated boys and girls equally.

Teaching is about generating and maintaining excitement in learning but it would seem from the evidence reviewed earlier that the learning approaches encouraged for boys and girls are different. This is compounded by girls' approaches to learning and assessment. Girls are much more likely for example to use the 'don't know' option and are less willing to guess than boys in multiple choice tests. Observations of pupils using computers in primary schools also suggests that girls are less willing than boys to explore possibilities and take risks even in operating machines; they seem to prefer to know how to perform a function before attempting it and are reluctant to 'play' with computers (as opposed to playing games on computers). Celia Hoyles (1988) noted that:

> It is a matter of grave concern that our culture is defining computers as pre-eminently male machines.
>
> (Hoyles 1988, p1)

In a Bedford Way paper, she goes on to say that gender differences in attitudes towards computers and in competence in using them 'are neither inevitable nor immutable' (p1). Differences arise from a social image of computers – whether or not it is appropriate, or usual, for girls to use them. Differences are also apparent in how girls and boys use computers and the access and the time available to them at home and school.

Gardner *et al* (1985) found that significantly more boys than girls saw computing skills as necessary for their future prospects. Scottish studies (Hughes *et al* 1985, Siann and MacLeod 1986) show that girls have lower expectations and motivation than boys in using computers. Whereas in 1986, 56% of nearly 500 boys reported have a computer at home, only 22% of a comparable sample of girls had one (Culley 1986 cited in Hoyles *op.cit.*). An interesting aspect of the studies quoted by Hoyles is girls' reluctance to compete for access to computers in school or for places in computer studies options in secondary schools (Gardner *et al* 1985). It is hardly surprising therefore that UCCA figures for applications and acceptances for computer science courses both show a steady decline in the proportion of females from 28% and 27% respectively in 1978 to 13% and 14% in 1986.

Access to curriculum

Both the nature and the opportunities for access to a school curriculum will have an effect on the attainment of boys and girls, and teachers are the gatekeepers of the curriculum. Even in a primary school, there have been various kinds of segregation which Clarricoates (1980) suggests reflect the value structure of the school in relation to the community values. For example in a locality where the behaviour of men was sharply differentiated from that of women (eg sharp sexual division of labour, men only bars and clubs) the

school reinforced the stereotypes children learned in the community. For example, it was typical up to the 1980s for primary teachers to ask boys and girls to line up separately as just one of the classroom management strategies based on sexual differences. Teachers' (and boys') expectations of girls were of neatness, reliability and conscientiousness:

> Not only different standards of tolerance were applied but also the same behaviour was categorised differently depending on the sex.
>
> (Clarricoates 1980, p31)

Clarricoates observed two boys of about five years of age playing with plasticine: Both are seized with a fit of laughter. They are allowed to carry on. But parallel to this, when two girls were caught up in a similar game and became noisy, the teacher classed it as 'giggling hysterically' and told the girls to 'calm down'.

In this same study, Clarricoates also provided evidence that the norms of the school reflected class differences of the neighbourhood. For example, the curriculum in a school with a middle class catchment area emphasised relationships and processes in most subjects whereas in the 'Dock Side' school, 'pupils were taught dates and things' (p.32).

In secondary school, access to particular areas of the curriculum can be crucial for the future careers of young people and in the literature there is a recurring emphasis on subject choice (Arnot 1985, Weiner, 1985) and concern about boys and girls traditionally 'choosing' different subjects. It is not an exaggeration to say that decisions made in early secondary school will affect the whole of some people's future lives. Explanations of differences in attainment of school leavers have therefore to take account of the different opportunities and experiences of boys and girls. Most international studies show that girls are less likely to study maths and science to an advanced level and are therefore not well represented in population surveys which are not controlled for curriculum background (Gipps and Murphy *op.cit.* p3).

Teachers' expectations

Teachers have a key role in encouraging their pupils to make the most appropriate selection of subjects according to their ability and interests but this can only be done successfully if teachers' advice is based on evidence and not stereotypical expectations. Quoting evidence from Walden and Walkerdine (1985), Elwood (1992) concluded that girls tend to be allocated to easier routes in maths than their ability warrants because they are seen as hardworking rather than bright and because they may be felt to be anxious about failure. Similarly, schools have avoided putting African-Caribbean children into academic/examination streams in case they were disruptive or unrealistically ambitious (Eggleston 1988). This unwarranted selection starts early: Tizard *et al* (1988) showed that in London infant schools, Black boys were overestimated and white girls underestimated.

There is no single factor which determines the curriculum choices that a boy or girl makes. Cole *et al* (1994) in a Scottish study attempts to account for why there is a gender bias towards males studying computing in secondary schools. They found that twice as many boys as girls took computing studies at Standard Grade and four times as many at Higher Grade. The authors surveyed existing research and suggested that these choices may be based on : girls lack of computers at home and school; the unfriendly nature of courses which are machine-centred and too inflexible to attract many girls; teachers' attitudes which continue to discourage girls explicitly or implicitly from studying

technology and science; the mode of assessment – the researchers quote Murphy's research showing that girls do better on essay-type questions and boys on multiple choice; and the role of technology – toys for the boys – with emphasis on the hands-on work being an end in itself without any critical appraisal of the role of technology in society. The slow take up of technology in schools by girls should be of particular concern since this is already affecting the gender balance of entrants into computing in F/HE (Durndell 1991). No one has suggested that girls do not have the ability to study computing.

All other subjects are affected by a comparable range of factors which tempt or discourage many boys or girls from continuing their studies. Turner *et al* (1995) noted that by 1975, at the time of the Sex Discrimination Act, boys had made greater inroads into a non-traditional area (home economics) than girls into technical subjects and computing. Patterns of boys' and girls' option choices have not changed much in the last twenty years. By choosing between 'girls' subjects (such as modern languages or secretarial studies) and 'boys' subjects (such as physics, chemistry, technology or computing), pupils are limiting areas of future qualifications. They are in effect making gender related choices about their future educational careers and employment prospects. HE courses in engineering still fail to attract female students although the rate of female participation in science course in HE has risen since the 1970s to nearly the same proportion as men by 1990. However, women are more likely to enter the biological sciences and men the physical sciences (Paterson 1994).

Pupils' choices

Linda Croxford (1994a) reviewed the implementation of the Scottish Curriculum framework introduced in 1983 following the recommendations of the Munn committee in 1977. The review focused on the S3–S4 stages (15–16 year olds) using data from the Scottish Young People's Survey (SYPS) from four cohorts over the period 1985–1991. The 1985 cohort was the first of these groups to be affected by the first curriculum framework; the second curriculum framework which included technological activities in the core, applied to the fourth SYPS group who entered S4 in 1989.

Croxford included two research questions specifically concerned with gender: Does the study of the core of each mode vary by attainment or gender? Has the introduction of the curriculum framework reduced the influence of attainment and gender on participation in each mode?

In relation to the first question, the probability of studying all modes in 1989 was associated with pupil attainment. For example low attaining pupils were more likely to study technological activities than high attaining pupils and conversely high attaining pupils were much more likely to study languages than low attainers. Boys and girls were equally likely to study mathematics and social and environmental studies. However girls were on average 24% more likely to study languages than boys and 12% less likely to study technological activities – with the greatest gender differences in participation in the middle of the attainment range. Relatively little work has addressed the gulf between boys' and girls' uptake and performance in modern languages. Clark and Trafford (1995) cite conflicting evidence about factors in schools affecting boys' performance (eg setting, forms of assessment). Despite the greater distribution of time teachers give to boys rather than girls, the latter perform better on average in modern languages. Other factors could be the predominance of female staff, the repetitive nature of much language teaching and boys' perceptions of it being a 'girls' subject.

In relation to the second of Croxford's research questions directly related to gender, Croxford found that the introduction of the curriculum framework meant that there was no gender difference over time in participation in languages. Boys and girls are now equally likely to follow the core of scientific studies although there are strong differences in the individual science subjects taken.

Croxford concludes that there has been some (albeit slow) progress towards meeting the explicit objectives of the Munn report to ensure that all pupils study a broad based curriculum and to reduce differentiation (in terms of prior attainment and gender) in participation in the modes of the curriculum. This had been most effective in the government's priority subjects: English, mathematics and science. The government white paper on science and technology noted that Scotland had achieved the objective that all pupils should study science until the end of compulsory schooling but that England and Wales had not (HM Government 1993/53). However there were still social class and gender differences in participation in other modes of the curriculum framework especially languages, technological activities and creative and aesthetic activities. Elsewhere, Croxford (1994b) argues that none of the sources of inequality in comprehensive schools – ability, social class and gender – are within the spirit of entitlement embodied in the Sex Discrimination Act (1975) and the Munn and Dunning recommendations for the curriculum framework.

However galling Croxford finds the slow rate of progress in Scotland, it seems brisk in comparison with access to parts of the curriculum in Northern Ireland according to Montgomery (1994). The Northern Ireland curriculum is very similar to the National Curriculum being implemented in England and Wales with minor modifications. English, Maths, Science and Technology are compulsory core subjects until 16. Although more girls are entering for and passing A-levels in Science, most girls concentrate on the Arts and Humanities and boys on Science and Technology. Gender separation at GCSE -level inevitably increases at A-level (Cormack *et al* 1992b). Montgomery concludes that girls are effectively ruling themselves out of important areas of employment and modern industry and technological services because of the curriculum choices they make when they are 13.

> The finding that more girls stay on at school at 16 plus and that participation rates in higher and further education for girls has increased must by viewed in the context of this gender segregation of subject choice with the types of subjects studied by girls and women often fitting them for areas of work traditionally open to women; jobs traditionally disadvantaged in terms of pay and future prospects.
>
> (Montgomery 1994, p4)

Montgomery (1990) is not convinced that the new common curriculum for pupils up to the age of 16 (following the Northern Ireland Education Reform Order 1989) will result in more equality of opportunity as, for example, the common curriculum for maths and science only applies up to the age of 13. After that pupils will still be able to head for choices stereotypically gender biased unless positive steps are taken to remove gender differentiation. Certainly in 1989, DENI found that boys and girls were still following traditional subject choices although there was some evidence that in co-educational schools pupils were more likely to cross traditional boundaries. For example, boys were more likely to be taught home economics and girls CDT or Technical Drawing in co-educational than in single-sex schools (Barry 1994).

External influences on the school curriculum

Perhaps, as Morgan (1994) suggests, access to curricula is to some extent outside a school's brief. She was very critical of the way in which gender was dealt with in the development of the New Curriculum in Northern Ireland where some subject working groups ignored gender issues either in the content or the learning/teaching dimensions of the subject. Two working parties come in for particularly acerbic comment. Business Studies and Modern Languages both suggest various measures to liven up the subjects and to attract more boys to these subjects. Morgan comments:

> This appears to leave open the question as to whether girls would also enjoy purposeful activities and a sense of success or whether they can be expected to tolerate boring and unrewarding lessons.
>
> (Morgan 1994)

Morgan can report no equivalent concern about the lower involvement of girls in technology courses. In mathematics, despite the large volume of research on the relative attainment of boys and girls (eg Burton 1986; 1990; 1994), the working group seemed to ascribe the differences to lack of confidence in the girls and that in turn to social and parental attitudes.

In the development of the New Curriculum, an extensive treatment of the ways learning situations affect girls and boys and the strategies teachers can adopt to help pupils, was produced in relation to only one of the core subjects, English, one in which as Morgan points out girls usually perform better than boys. Potentially the New Curriculum could be used as a vehicle for improving gender equality but it seems that the very way in which it was established offers no guarantees that in practice this will be the case. I have not come across a comparable analysis of how gender was taken into account in the 5–14 Development Guidelines.

Ethos and priorities of schools

Sammons (1995) suggested that a substantial contribution was made to raising the achievement of girls (and of ethnic minorities) by all inner London schools and ILEA itself, through diverse equal opportunities initiatives during the 1980s which were deliberately focused on implementing strategies (with corresponding resources) aimed at enhancing opportunities.

Similarly schools in Scotland are being encouraged to take positive steps to deal with any existing inequalities with the help of ethos indicators published by the Scottish Office and by individual regions related to equality and justice. Schools are expected to consider issues of equality and justice and implementing relevant action in their development plans.

Such opportunities are well within the remit and feasibility of decision making at school level but one wonders about the impact of staff role models on pupils. Male and female staff are not equally represented in different subject areas or in terms of management responsibilities. This review has not examined in detail the associates between the gender of subject teachers and the proportions of boys and girls opting for their subject. However Murdoch (1995) indicated that fewer than three percent of technical teachers were female and this area has the lowest take-up by girls at Standard Grade. In Scottish Office figures published in 1992, the gender breakdown for staff in September 1990 showed that although 46% of secondary teachers were women, only 3% of secondary headteachers were women and six Scottish authorities had only male

secondary headteachers. At that time only 7% of Depute Headteachers in Scotland were female so five years later the overall situation will not have changed significantly. The implicit message being conveyed to pupils is that boys can possibly expect management to be an option but girls should not.

11.3 System and society

So far I have outlined environmental explanations concerned with home and school as if changes in these quarters would remove inequities. This would ignore definitions made earlier that equity is to do with social justice and requires more than support of the Scottish myth of a meritorcratic education tradition:

> No myth is more prevalent and persistent than that asserting Scotland is a 'more equal society than England (or Britain) and the Scots are somehow 'more egalitarian' than other in these islands.
>
> (McCrone *et al* 1981)

Consistent with this is the stance of the Secretary of State for Scotland in 1992: that correlations between performance and social backgrounds are entirely due to the opportunities and expectations schools have of their pupils (Paterson 1992). As the quotation at the very beginning of this review indicates, this reflects not just a belief in a system but assumes that education provides people with knowledge and skills on an equal basis; and that the level of education people obtain depends primarily, if not solely, on their intellectual abilities.

Morgan (1994) similarly concludes that although the new curriculum in Northern Ireland is intended to assure equality of access to a broad and balanced education for all pupils, the reality is somewhat different. One difficulty arises from an interpretation of equality in which provision of the same programmes of study for all pupils is seen as providing a basis of equality for all. This goes back to definitions in the introduction to this review

> Disadvantaged groups have rarely been able to improve their position when they are offered equality of provision unless this is accompanied by more positive targeted measures.
>
> (Morgan 1994, p28)

Differences in the inputs and outcome of education are not randomly distributed (Stromquist 1989); they seem to negatively and persistently affect certain populations: mostly the rural, the poor, racial minorities and women – all groups with limited political power.

In Scotland, there have been a few targeted measures to overcome the negative affects on certain groups and these are mostly associated with girls' improved participation and attainment in science. Turner *et al* (1995) suggest that comparable initiatives to encourage girls into science (Women into Science and Engineering (WISE) and Girls into Science and Technology (GIST)) should be available to encourage boys to take up modern languages where their participation has declined over the last twenty years.

Another important area not yet touched upon is the preparation of teachers, which is crucial to break the cycle of continuing stereotyping in schools. Deem considers:

> ..a major potential area of change lies in the training of teachers to be much more aware both of the processes of gender – typing and gender categorisation – going on in schools.
>
> (Deem 1980, p177)

She recommends identifying any differences in the way men and women approach teaching and in particular how teacher training endorses stereotypical gender-appropriate behaviour. One contribution has been the (near) eradication of sexism in school books although I suggest that a review of sexism in computer software used in Scottish schools is overdue.

> It will be a complex and difficult task to overcome the structures of patriarchy both inside and outside schooling in such a way that they are not replaced by even more restrictive structures but instead by structures in which the liberation and fulfilment of individuals over-rides not only gender considerations but also class and ethnicity too.
>
> (Deem 1980, p182)

There are changing social, family and employment structures and with them changing expectations of males and females. Perhaps there will also be changes in attitudes towards achievement. David Gillborn (1992) notes

> that people speak of under achievement of certain groups rather than the under achievement of the education system itself. In this way a tendency to blame the victim is repeated.
>
> (Gillborn 1992, p28)

This may have been true when it seemed that girls and members of ethnic minorities were considered to be underachieving but it is noticeable that when 'boys under achievement' came on the agenda, suddenly it is the system that is under scrutiny. Gillborn is only concerned with class in this paper and makes no reference to gender differences (his examples only concern boys). His work is useful for the purposes of this review because he suggests the importance of for using 'disadvantage' or 'inequality' rather than 'under achievement' since these terms draw attention to the structures and systems which provide the context for pupils' achievements.

11.4 Conclusions

Examinations started in the mid-nineteenth century in universities in Britain, and in secondary schools in the early twentieth century. Since that time public examinations have been required to fulfil both selection and accountability functions and to a lesser extent diagnoses, evaluation and guidance (Murphy and Torrance, 1988). Success in public examinations taken towards, or at the end of schooling, now provides evidence of a school's standing in league tables implying the quality of the school. For the successful candidate, qualifications from the top rung of one institution provide access to the bottom rung of the ladder of another. Qualifications are an easily recognisable currency – much more so than schemes of profiling – and those recognising them as pre-requisites and tools for selection for entry to further/higher education or to training do not normally have the awareness, time or skills to consider differential gender effects in achieving those results.

The gaps between boys' and girls' attainments in academic public examinations has remorselessly moved in the last twenty or so years to favour girls even in mathematics and science. When girls were seen to be less successful, explanations were in biological terms or in characteristics acquired by girls as part of the engendering process. Now that the position is largely reversed, it is the system of education which is quickly under scrutiny. Boys are however well ahead in achieving vocational qualifications and for parity we should be considering not only how the system of schooling may be failing boys how the system of post-school education and training is failing girls.

The fact that there is higher attainment in public examinations for both sexes should not:

> lead to complacency, however, as the pattern of subject choice has changed little and by opting for some subjects... rather than others.. girls fail to acquire entry qualifications for many courses and types of employment.
>
> (Turner *et al* 1995, p23)

In particular we should be concerned about the small numbers of girls gaining the prerequisite qualifications for careers in computing and technology. The research literature reviewed here has demonstrated gender differences in attainment. The tasks ahead are to clarify what needs to be done for all our students, males and females, to gain the maximum benefit from their education. The Coleman report focused on the influences arising from the inequalities in society that can affect achievement. The survey carried out as part of this study addressed five concepts of inequality. These are reported by Gipps and Murphy (1994) as:

- differences in input characteristics (in schools), such as income, quality of staffing and other resources
- differences in social and racial composition of the school population
- inequality arising from intangible characteristics of schools, such as teacher morale, teacher expectation of students, student motivation, etc.
- inequality in terms of the effects of the school for individuals with equal backgrounds and ability, ie equality of results given the same individual input
- equality of results given unequal individual inputs.

(Gipps and Murphy 1994, p12)

There is a continuing gender imbalance in the take up of further and higher educational opportunities with fewer girls engaged with continuing vocational qualifications and in vocational training and many well qualified girls not proceeding into higher education. It is likely that gender imbalances in educational attainment, both at school and subsequently, will not right themselves without deliberate initiatives which are carefully monitored and evaluated. Initiatives should however be based on clear evidence and there has been little research on gender related learning and attainment since Bamford's review in 1988. This absence led Turner *et al* (1995) to talk of continuing to monitor bleakness in Scottish research concerned with gender. Such as there is concentrates on describing the status quo rather than seeking to explain differences or stimulating change. The final section of this report makes suggestions for future research agenda.

Summary points (11)

Recurrent theories to explain gender differences focus on aspects of assessment, biological and environmental arguments and explanations:

- ➤ environmental influences which affect gender and attainment are: in the home and the society in which the family operates; school experiences; and broader educational policies within which educational organisations operate
- ➤ rather than a single factor, it is the cumulative disadvantage accrued from a complex interaction of social and educational factors which affects a pupil's uptake and success in educational opportunities but it is not clear how boys and girls are influenced differently

- parental and other adult role models do not similarly affect the attainment of boys and girls of all ethnic groups. Class differences also have an effect at all stages of educational attainment
- schools make more impact on girls' than boys' attainment in subjects and skills learned primarily at school
- evidence suggests that in the UK as a whole: boys from mixed schools are more successful that girls from mixed schools; and girls from single sex schools did better than peers in mixed schools
- teachers' expectations and interactions with boys and girls affect how pupils develop a gendered view of subjects even from an early age
- gender differences persist at all levels of education with females reluctant to participate in computer studies and males in modern languages. Despite a range of initiatives, girls are still under-represented in engineering courses in higher education and in training opportunities
- there is a lack of research evidence about factors concerned with high attainment and about how the school system may be failing boys and the post-school system of education failing girls
- policy makers have keen responsibility to ensure that issues of equality and justice are taken into account especially in formulating or encouraging strategies for actions to remedy any imbalances in access and uptake of educational opportunities in all sectors. Such strategies apply to curriculum, resources, staffing, and preparation and professional development of teachers.

SECTION THREE

Continuing issues of concern in relation to gender and attainment

12 Context for the future

> There is no major 'natural' barrier to equity between the sexes in matters of education; differentiation in learning and level of response is largely dependent on the social environment. And social environments can be changed – though whether they can be changed from within an educational system is a matter of serious doubt.
>
> (Sutherland 1981, p200)

The studies covered in this review show that there are unresolved issues in relation to gender and attainment which should be addressed within the distinct cultural context of Scotland. Whereas English educationalists have frequently highlighted the effects – among them discrimination on grounds of gender – of a long history of class division and elitism in English education, there is a powerful tradition of egalitarianism in the history of Scottish education which, as a number of commentators (eg Erskine, 1992) has pointed out, have made it difficult for the problem of gender inequality to be raised. There is a strong belief that the principle of equal opportunities is deeply ingrained within the education system and that it is up to individuals to take advantage of what is available to all. Consequently, many teachers and educationalists hold that the interests of gender equality are best served by adopting a 'neutral' stance. The notion of 'positive action' to promote girls' and women's interests and participation in non-traditional areas is seen as particularly threatening as our own research in the context of a Scottish university has revealed (Farish *et al* 1995).

There are a number of fairly recent developments which suggest gender inequality may become a higher priority at local and national levels. The Scottish Consultative Council on the Curriculum (SCCC) has issued a both a position statement and guidelines for schools to adopt in promoting equal opportunities generally (SCCC 1993). In 1991, the General Teaching Council brought out the strongly argued report referred to earlier in this review and which supports anti-sexist initiatives in schools. At regional level, a number of education authorities have drawn up policy documents and guidelines in relation to equal opportunities generally although it is apparent from the work of Turner *et al* (1995) that some authorities still have a long way to go in implementing their strategies.

It is against this gradually changing context that continuing themes for future research are summarised. What is the relationship between socio-economic factors and employment prospects and the fact that more young people of both sexes are continuing their education after compulsory school age? Are better qualified young people more likely to get jobs than those with few or no qualifications?

Looking to the future, the Equal Opportunities Commission (1994) estimate that at the turn of the century women will hold almost half the jobs in the formal economy. However most of the extra jobs expected to be taken up by women by the year 2000 will be low status, low paid and part-time with employment prospects for women from ethnic minority groups being particularly bleak. Women in full-time work currently earn

about 79% of men's earning but those in part-time work only earn about 25% of men's earnings.

Action suggested by the Equal Opportunities Commission (October 1994) in response to the consultation paper for the review of the National Advisory Council's Targets for Education and Training (NACETT) for the year 2000, included the following action points particularly relevant to this review:

- initial teacher-training and in-service education should strengthen study of the impact of gender on achievement by girls and boys
- systems of schools, further education and higher education inspection should be enhanced to counter sex discrimination and to secure equal opportunities (in terms of gender)
- options within the new National Curriculum should be avoided where they permit the re-introduction of stereotypic subject choices by girls and boys
- sustained support of modern apprenticeship prototypes and schemes to ensure that they do not reflect the gender inequalities of the traditional apprenticeship
- a through re-appraisal of the role of personal career development skills in both school and post-school academic and vocational qualifications.

These courses of action advocated by the EOC would certainly address some of the gender issues discussed in this review and in themselves provide the basis for a research programme which would compensate for the general neglect of gender in the Scottish picture of educational achievement. However, this review of research into gender and attainment has also indicated the complexity of the issues involved and therefore in this section, I have grouped some of the key areas for action and further inquiry (including those listed above) into two broad themes:

- monitoring current policies, practices and outcomes in relation to gender and educational attainment
- factors which contribute to educational attainment.

The final comments are directed towards the kinds of studies necessary.

13 Monitoring policies, practices and outcomes

The biggest and probably the most difficult area of effects on gender and attainment to monitor is the implementation of the swathe of changes in education over the last ten years which have implications for all sectors of education and training. For example: one of the most recent proposals is a voucher scheme for nursery education; the implementation of 5–14 and its assessment may have differential effects on the performance of girls and boys; an outcome of the Further and Higher Education Act (1992) is a reduction of funds for programmes which are not explicitly vocational and accredited; expansion of student numbers in further and higher education has an impact on class size and teaching and learning methods. The implementation of Higher Still will provide another area for monitoring gender effects. Is there evidence of any of these many changes resulting in gender-related negative effects?

There is an absence of systematically collected evidence about gender differences in relation to Scottish education. What evidence should be collected to illuminate relationships between gender and attainment? There is also a need for systematic monitoring of current practices and outcomes through the stages of 5–14 and Standard Grade to Higher Grade, as well as for further and higher education. For example, current evaluations of 5–14 commissioned by the Scottish Office are more concerned with the implementation of the new curriculum and associated assessment than with more subtle relationships between gender and attainment.

13.1 Further and higher education

Further education is one of the most neglected areas of educational research and gender issues are just one of the missing items among many. What is noticeable however is the rapid increase in part-time female students in FE, many of whom will be mature students. Having to juggle family and financial commitments is probably still a gender issue. In relation to mature students various Scottish studies have identified differences in the access mature men and women have to education post school, in the course they choose, in their motivation for returning to study and in their needs for education at different times in their lives. For example, women who return to education are likely to have wider interests and are more likely to pay for themselves than men returners. They tend to follow courses related to their jobs and to be paid for by their employers. What is needed is a clearer gender profile of young students in further education.

Currently there is no monitoring of the take up of F/HE in Scotland by specific minority ethnic groups or of people with disabilities and therefore it is not possible to see how this relates to men and women respectively.

Why do more girls not go into higher education – other than teacher education? Of girls who do well at school, disproportionately fewer continue into further and higher education than boys. Adult influences are probably very important here especially when parents or schools provide messages that do not promote higher aspirations in girls.

Teacher education has been one of the main routes into higher education for young (and mature) women in Scotland but as numbers of teacher education places decline, there has been some increase in other full time higher education outlets.

Much of this information about applicants is available on UCAS forms and it would be helpful to access and publish the figures relevant to Scotland. Statistics published by the Scottish Office do not record the public examination achievements of various ethnic groups so it is not possible to comment on the relative take-up of further and higher education among such groups. However it would be possible through analysis of higher education statistics to pull out figures for Scottish HE institutions relevant to the proportion of young men and women from different minority ethnic groups who apply and who gain admission to higher education.

There are new apprenticeship schemes and it is important to monitor gender related factors given that fewer girls than boys have taken up training and apprenticeship opportunities. Sex stereotyping in the selection of vocational courses (although not covered extensively in this review) is a continuing feature of vocational education.

A final area for investigation is that students in further and higher education are increasingly likely also to be in employment. What are the gender related effects on attainment? Is there a link between fewer well qualified girls than boys progressing into higher education and the considerable increase in part-time female students participating in further and higher education?

13.2 Attainment

The research question to be addressed is to do with the most appropriate kinds of records and statistics which should be kept as a data base for monitoring the educational career and achievement of males and females. This ties in with the final recommendation made by the EOC (1994) for

> the collection of much more comprehensive and accurate data on participation in education and training by gender, ethnicity, disability, age, level and occupational area. (p15)

Studies which have highlighted differences in attainment are mainly concerned with a narrow range of subject areas i.e. maths, science and language. The other areas of the curriculum especially the arts and subjects which are part of cross curricular themes, have been the subject of relatively little main stream research relevant to attainment. Is this because of where they are reported, because there are not significant differences in other subjects or because concentration has been on areas of girls' and more recently boys' under achievement? It is difficult to make comparisons where basic data is absent and there are no Scottish national measures available in subjects other than maths and English except at Standard Grade where a self selecting sample is operating. This raises a more fundamental issue about the priorities given to certain subjects and the absence of others in developing national assessment schemes.

It is interesting to see what causes concern about boys and girls achievement, what makes the headlines and what is being assessed. Why, for example, has there been so little interest in girls' relatively poor performance skills in PE although this could affect their health and healthy behaviour throughout their lives? Gipps and Murphy (1994), and Foxman (1992) noted that where boys and girls conform to expectations (i.e. girls better on writing and boys in science), it goes unremarked:

> What comes across in all these studies is that the authors are writing from a standpoint of assumed male superiority in maths and science, and female superiority in verbal and written skills. Any variation from this (eg girls' better performance in science) either needs explaining away (Comber and Keeves 1973) or is glossed over by focusing on boy's performance.
>
> (Foxman 1992)

13.3 Learning styles

Caroline Bamford suggested that the differences in the education of male and female pupils and students should take account of differences in learning styles, subject choice, levels of attainment and access to educational opportunities. Moreover the principles behind any differences in the education designed for boys and girls should be made explicit especially where these make assumptions about their different lives as adults.

Relatively little is known about pupils' learning styles: typologies of teaching styles are more common. It has been suggested when students are assessed that their different learning styles and experiences may result in:

- students of different sexes or from different ethnic and racial backgrounds not responding to certain items
- students following a different track from that assumed by assessors
- providing alternative, though adequate, solutions
- expressing answers in ways which are devalued and attributed lower scores by assessors.

Some of these are the very attributes recognised as indicators of creativity but which are 'taught out' of pupils by the requirement to prepare them for public examinations. Perhaps this explains the tendency, noted in the review, of girls answering questions only when they are confident of being correct. Is this a feature of gender related learning styles or has the schooling experience encouraged girls to conform, to be 'good pupils' and not to take risks? Boys may be disadvantaged in other ways. We need more understanding about how boys and girls learn, the kinds of peer support, pressures and role models which influence their approaches to learning and to education at school, and subsequently at college and university where men continue to collect most of the higher class awards.

13.4 Subject choice and examination entry

Considerable progress had been made in terms of the subjects that are accessible to pupils. It is less likely now than thirty years ago that boys or girls would be necessarily be precluded from taking a subject stereotypically not associated with their sex. Girls and boys were allocated to cookery and woodwork classes because of their gender. There are still problems of time tabling multiple options but gender cannot (under the Sex Discrimination Act) be the main determining factor. Nevertheless there are differences in the proportion of girls and boys opting to do particular subjects and there are interesting areas for investigation in why pupils choose particular options, each of which will have implications for which future programmes and courses will remain open to them.

As noted in the review there have been increases in the percentages of girls taking science subjects but there is more reluctance among boys to take subjects more traditionally associated with girls and the gender gap in modern languages has increased in Scotland over the last five years. Moreover there is little research into why boys avoid subjects with a traditionally high female participation compared with considerable

research into the reasons for low female participation in those subjects where they have been under-represented.

Schools may be affecting these choices by the school entry policy for examinations especially where schools seem to limit entry to those with a very high probability in succeeding. For example, Elwood (1995) emphasises that we need to examine whether gender differences in examination entries are due to lower attaining boys not being entered for GCSE while girls at the same level are. It is also relevant to go back to the comments from Stobart *et al* (1992) suggesting that a higher proportion of girls enter the intermediate level for GCSE mathematics rather than the higher or foundation grades as a 'safety option which offers the key grade C and avoids the risk of being unclassified.

13.5 Access to learning opportunities

Despite apparent equal access to the same learning opportunities for boys and girls, gender differences in attitudes and motivation can emerge. Computing provides an interesting case to explore how such gender differences develop. Computing is a relatively new subject that has quickly become more appealing to boys than to girls although initially girls are keen on using computers. Among secondary school pupils, girls have reported less experience than boys in using computers in school. Added to this, boys are significantly more likely than girls to own computers and use them more frequently outside school than girls (Durndell *et al* 1995).

Educators have to take some responsibility in terms of what they provide in terms of curriculum, hidden curriculum and materials in limiting and encouraging stereotyped patterns of learning and behaviour. For example, software recently seen in a Scottish Primary One class has a simple shape matching task and the correct answer is 'reinforced' by two figures shooting at each other. The use of even this level of violence seems inappropriate as a reward for any cognitive task and can only serve to reinforce macho images of computing.

Some schools have developed positive strategies to engage both boys and girls in unpopular curriculum areas. A secondary school found that following discussion of the careers for which physics was necessary, the numbers of boys and girls increased; they were able to make a more informed choice of their subject options. Such strategies improve equity in access.

13.6 Methods of learning and teaching

Pursuing this point further, it seems appropriate to endorse some of Sandra Johnson's recommendations which are particularly relevant to the work covered in this review and may affect the options that young people follow into public examinations. In particular broadening the AAP survey to include affective factors would be pertinent to choices for all subjects to be publicly examined. To promote the levels of attainment for both boys and girls, it would be helpful to have a clearer understanding of how different subjects are taught, and (building on the work on classroom environments mentioned by Johnson), the particular methods of learning and teaching which promote positive attitudes towards learning for different students.

The longitudinal design for AAP offers splendid opportunities to track some individuals through their school and post-school education. Collation of individualised information, as Johnson suggests, on such items as test performances, attitudes, interests and out of school activities and set alongside performance in examinations at the end of the school

career is a mouth watering possibility. Being greedy, it would be a unique opportunity to follow these individuals into their post school education and career – an excellent way to monitor variations in gender and achievement for individuals and across groups.

The review has referred to Trew and Turner's research which indicates that the teaching methods used in science encourages more adventurous approaches to learning and to assessment, enhancing self confidence and encouraging risk taking. If this is the case, as fewer girls take science, this aspect of their intellectual development is being relatively neglected unless other subject areas are also endorsing risk taking as a legitimate learning device.

Reference was made earlier to the narrow range of subjects which normally cause anxiety about pupils' attainment. AAP surveys are limited to language, maths, and science and these certainly are important for personal competence as well as the key to future education. There are three main points arising from this.

Firstly, girls seem to make more progress than boys in areas where there is very closely defined teaching – such as maths. A possible explanation is the introduction of 5–14 resulting in what is assessed being closer to what is now taught in schools. This leaves in abeyance the issue of whether or not teaching is being determined by the assessment, or assessment following what is taught. The National Curriculum in England and Wales puts more pressure on teachers (than the 5–14) to match their teaching very closely to assessment since pupils' attainments are collated centrally in order to produce school league tables.

Secondly, there is little mainstream research concerning gender and attainment in the arts, in creative activities.

Thirdly, how do experiences in primary and early secondary school affect pupils attitudes and opportunities later in the secondary school and by the end of their school career?

14 Factors which contribute to gender differences in attainment

A broad range of factors is generally considered to be related to pupils' attainment and the areas which merit more attention include the circumstances of assessment, the social context and differences related to gender in learning styles and methods of teaching.

14.1 Methods of assessment

In 1979, the Scottish Office published a set of papers, *Issues in Educational Assessment*, in which none of the ten distinguished Scottish authors referred to gender as an issue worthy of mention. Since then, there has been considerable work examining factors within the assessment process which can disadvantage either males or females. Wood (1987) argues that formal assessment has both promoted equal opportunities and militated against them. It seems to offer impartial assessment but on the other hand all children are not equally prepared to compete and there may be negative social outcomes of testing, or side effects (eg labelling) from bias in tests or testing procedures. There has been little research done on pupils' attitudes towards assessment and tests although this could be a crucial factor given work such as Quinlan's (1991) which provided evidence of girls' better performance in GCSE and O-level being associated with the course work component and the move away from timed tests which some pupils found very pressurising.

Any differences which may exist at one age are not necessarily predictive of relative performance between boys and girls at another age. Elwood (1995) indicates that most research concerned with gender related differences in performance in examinations and assessment in the UK, focuses on compulsory school age especially age 16. The demands of assessment in Higher Grade and in further and higher education are ill matched with the skills encouraged at earlier stages in education. Consequently, girls who have performed relatively well at school do not sustain this advantage at degree level.

If, as Gipps and Murphy assert, affective factors interact with gender and method of assessment, this means that some tasks may be measuring students' levels of confidence in themselves rather than the assumed construct. This in turn suggests that research is needed to explore the *characteristic* responses of males and females to assessment tasks. Any 'don't know' responses may be about levels of confidence rather than knowledge and understanding. For example, Hudson (1986) reviewing maths tests among 17 year olds concluded that girls' approach to problems handicapped them in comparison to the boys.

As methods of assessment change, so it is necessary to monitor any differences that could be due to cultural bias in the test and differences between a pupils language and that expected by the test. Does the form and content of the tests depend upon characteristics associated with one group – eg upper-middle class white males? How does the teacher assessment lower down in the school relate to performance in public examinations?

Bias is an important factor to take into account when developing new methods of assessment and it is interesting that this review of the literature shows a lack of published research concerning potential bias in SCOTVEC modules either in terms of test items or in marker bias. This leads on to another related area – the composition of examination boards and subject panels and the proportion of men/women involved in crucial assessment decisions.

14.2 Social context of learning

Social factors define and redefine what is meant by achievement and it is interesting to note how the curriculum has developed both for different sexes and classes. In the nineteenth century, household management skills were reserved for the future lady of the house and laundry skills for the future working woman. By 1862, elementary working class girls were on equal footing to boys : the amount of money earned by teachers in the payment by results scheme for successful examination results were the same for boys and girls. In the 1870s new gender specific subjects were introduced: sewing, knitting, cooking for girls and in 1880s laundry work, dress making, home nursing, elementary hygiene and physiology; for boys more mathematics and technical drawing. Most middle class girls developed 'accomplishments': piano playing and etiquette.

At different periods, the system endorses different values. Recent changes in GCSE practices have resulted in a broader range of texts being used including more from women and from ethnic minorities. This highlights the issue of what it is valuable to learn. It is reasonable to review what the system, and the schools currently value – neatness? spelling? taking risks? What does it mean to be a good pupil in a Scottish school and how does this tie in with the criteria being used in public examinations? Are such criteria consistent, or at least articulated within the different stages of a school career? Certainly school audits could uncover what is happening and what is valued in relation to gender and attainment at different levels in the school. This overlaps with the points made earlier about the importance of every aspect of a school (the curriculum, role models, hidden curriculum, materials) potentially having a direct or indirect affect on the attainments of boys and girls.

The current social climate sees a slight back-lash against positive action taken for girls and women although the EOC action list (listed at the beginning of this section) is designed more to right the continuing under-representation of females in certain fields than to promote male interests in areas where they are under-represented. The issue here is how to proceed to ensure equity for both sexes and this may mean some positive action schemes for boys.

14.3 Cultural and sub-cultural factors

Lindsay Paterson points out that there is no work published in Scotland on interactions between ethnicity and socio-economic status and many analysts consider that other variables: class, ethnicity, geographical location and age – also interrelate with gender.

George McBride (Brown and Riddell 1992) introducing the EIS conference in November 1991 on education, equality and quality argued that whereas considerable progress has been made in terms of achieving gender equality in schools, 'measures to achieve class equality have scarcely been explored' and inequalities associated with race have received even less attention than inequalities of class and gender. Class and ethnicity are hidden factors in educational attainment in Scotland. Our local authorities have certainly varied in the past in the information collected about race and gender and

therefore it would be difficult at this stage to review aspects of attainment and ethnicity. OFSTED is about to publish a review of ethnic minority attainment in schools in England and Wales (authors David Gillborn and Caroline Gipps).

Gipps and Murphy (1994) acknowledge the importance of seeing gender in relationship to other variables affecting school attainment.

> The existence of and nature of ethnic or gender differences in attainment in national qualifications which are of such significance in determining future education and employment prospects are clearly of particular relevance to the consideration of equity in access to such opportunities.
>
> (p466)

The implication is clearly that more research on a larger scale exploring the complex and changing relationship between gender, ethnicity, class and educational attainment should be a priority.

14.4 Adult influences

In addition to methods of teaching, adults influence attainment in a number of ways and it is uncertain whether there are different effects on boys and girls in terms of parental attitudes and role models

The review quoted Sammons' point that the British sociological/educational research tradition has concentrated on factors associated with poor educational attainment but overall less attention has been paid to factors associated with high attainment. High social class, gender, greater level of parental educational experience and qualifications, cultural capital in the home, and membership of certain ethnic groups have all been found to be associated with higher educational attainment and, except for gender, participation in higher education (Sammons *et al* 1985, Mortimore *et al* 1988, Nuttall *et al* 1989). SYPS found that children whose parents were owner-occupiers left school with more SCE qualifications than those in public sector housing, but there was little difference in terms of SCOTVEC modules gained.

Parental attitudes towards girls and boys in different ethnic and socio-economic groups may well vary. Stromquist found in her re-analysis of 90 empirical studies of gender and attainment that family decisions persistently, but not always visibly, operate to affect the participation and attainment of girls. Parents negatively shape the type and level of their daughters' education by: seeing sons' future employment as more important; using daughters labour for domestic tasks; endorsing religious and cultural values that prescribe gender separation, sexuality control or mother/marriage responsibilities for women. The Scottish studies reviewed so far have not distinguished between the effects of parental education and attitudes on males and females and there does not seem to be evidence of this kind about the Scottish context in particular. Two areas of study are appropriate:

- the impact of restrictive or limiting sexual stereotypes on girls' and boys' aspirations and achievement
- the practices and beliefs expressed by the family and by the school regarding the education of boys and girls, men and women.

14.5 Teachers

Both parents and teachers provide role models and the hierarchy of Scottish education – especially in secondary, further and higher education – is dominated by men. What factors do male and female senior teachers regard as enhancing, or being an obstacle to, their own career? How does the teaching profession consider positive role models influence the attainment of male and female pupils? Issues emerging from various AAP surveys could be examined more carefully and thought given to the ways in which any differences in boys' and girls' attainment are reported and further dissemination of appropriate advice that could be given to teachers about dealing with gender differences for example in 5–14 science.

Important areas of influence on teachers themselves have to be their preparation for teaching and subsequent professional development. This review has not addressed the initial or in-service education for the teaching profession although gender issues have certainly concerned the GTC who have produced gender related materials for teachers. To what extent do teachers feel confident and competent in using strategies equally likely to promote learning and attainment for boys and girls?

Teaching strategies comprise a rich area for enquiry: methods of teaching and organisation, selection of resources, teacher interaction with boys and girls and of course teacher assessment are all topics relevant to gender and attainment. Where do teachers feel most in need of support in order to provide the best opportunities for all their pupils to perform well in assessed tasks and examinations?

15 Summary of topics for action and enquiry

This short final chapter represents some of the most salient issues emerging from this review and suggests an agenda for action.

15.1 Monitoring current practices and outcomes in relation to gender and attainment

There is an absence of systematically collected evidence to underpin policy and action on gender differences in relation to many areas of Scottish education. The following are suggested topics for policy and action.

Effects of policy

- What are the effects on gender and attainment of the implementation of Scottish educational policy changes over the last ten years?
- What are the most appropriate kinds of records and statistics which should be kept as a data base for monitoring the educational career and achievement of males and females ?

Methods of learning and teaching

To promote the levels of attainment for both boys and girls, it would be helpful to have a clearer understanding of how different subjects are taught, and (building on the work on classroom environments mentioned by Johnson), the particular methods of learning and teaching which promote positive attitudes towards learning for different students. This could be through exploiting AAP surveys for longitudinal profiles of individuals as they move through school and post-school education.

- Are there gender related differences in how people learn and in the kinds of peer support, pressures, role models and teaching styles which influence their approaches to learning and to education at school, college and university?
- What are the cultural and subcultural differences in approaches to learning by boys and girls?

Monitoring the whole curriculum

Studies which have highlighted differences in attainment are mainly concerned with a narrow range of subject areas i.e. maths, science and language. The other areas of the curriculum especially the arts and subjects which are part of cross curricular themes, have been the subject of relatively little main stream research relevant to attainment. It is difficult to make comparisons where basic data is absent and there are no Scottish national measures available in subjects other than maths and English except at Standard Grade where a self selecting sample is operating.

- What insights can be gained by comparing learning and achievement of girls and boys across the full range of curriculum areas?

Subject choice, examination entry and access to learning opportunities:
There have been increases in the percentages of girls taking science subjects but boys are less likely to take modern languages and subjects more traditionally associated with girls. In England and Wales school entry policies for examinations suggest that lower attaining boys are not being entered (for GCSE in England) whereas girls at the same level are.

- Are there comparable examination entries from girls and boys at the same level?
- What strategies can be used to encourage boys to opt for subjects with a traditionally high female participation?
- How can schools ensure that the ethos of the school, the materials and teaching deployed do not encourage stereotyped patterns of learning and behaviour? What part can school audit play in monitoring school practices in relation to gender and attainment?

Further and higher education:
Further education is one of the most neglected areas of policy research and gender issues are just one of the missing items among many. Areas which particularly need to be addressed relate to the gender profile of young students in further education , gender related factors in training and apprenticeship opportunities, and the relationship between public examination results and take up of F/HE in Scotland by males and females from specific minority ethnic groups.

- How can the monitoring procedures in further and higher education be improved in order to provide a clearer profile of the student cohorts in terms of gender, ethnicity and social class and student attitudes?
- Further education has been little researched in terms of gender and achievement. What are the most fruitful areas for enquiry?
- What strategies are being implemented to ensure that there is equality of access to training and new apprenticeship schemes for school leavers?
- To what extent do management practices and quality assurance procedures in further and higher education foster access and achievement of male and female students?

■ 15.2 Factors which contribute to attainment

This review has identified a broad range of factors contributing to gender differences and educational attainment and the following areas are pertinent to future research and policy relevant to students and to initial and in-service education of teachers:

Methods of assessment
Are some methods of assessment measuring students' level of confidence rather than the assumed construct of knowledge and understanding? There is a proliferation of vocational qualifications accessible to entrants from secondary school and older students but as yet little attention has been paid to gender related matters such as test items, marker bias or reasons for opting for particular modules in vocational qualifications.

- Are there *characteristic* responses of males and females to assessment tasks. Is it likely that *don't know* responses are about levels of confidence rather than knowledge and understanding
- What does it mean to be 'a good pupil' in a Scottish school and how does this tie in with the criteria and attainments in public examinations? Are such criteria consistent, or at least articulated within the different stages of a school career?

- What are the features in learning and assessment in higher education that could have a bearing on the lower proportion of female than male students achieving first class degrees?
- Is it possible to identify the features contributing to successful learning for males and females?
- How do the curriculum and assessment of vocational qualifications take account of potential differences in learning styles and interests of male and female students?

Cultural and sub-cultural factors

Class and ethnicity are hidden factors in educational attainment in Scotland with considerable variation in the data collected by local authorities. There is clearly an imperative to explore the complex and changing relationships between gender, ethnicity, class and educational attainment.

- How does the combination of a students' gender, ethnicity and class relate to their educational attainment?

Adult influences

In addition to methods of teaching, adults influence attainment in a number of ways and it is uncertain whether there are different effects on boys and girls in terms of parental attitudes and role models. Scottish studies have not, so far, distinguished between the effects of parental education and attitudes on males and females.

- What are the effects of parents' education and attitudes on the attainment of males and females in Scotland?
- What are the practices and beliefs expressed by the family and by the school regarding the education of boys and girls, men and women and which might influence attainment? How do adults' restrictive or limiting sexual stereotypes affect girls' and boys' aspirations and achievement?

Teachers

Teachers provide role models and the hierarchy of Scottish education – especially in secondary, further and higher education – is dominated by men.

- To what extent do teachers feel confident and competent in using strategies equally likely to promote learning and attainment for boys and girls? How could initial and in-service training be improved in this respect?
- What would teachers like to see as the future focus of research into gender and attainment?
- What factors do male and female senior teachers regard as enhancing, or being an obstacle to, their own career and providing a role model for pupils? How does the teaching profession consider positive role models influence the attainment of male and female pupils?
- How does school ethos promote the highest attainment for all pupils? How can teachers best be supported in order to optimise opportunities for all their pupils to perform well in assessed tasks and examinations?

15.3 Future research models

It is relatively easy to generate ideas for future research but it is important that research initiatives take into account the needs and wishes of young people as well as government, industrial, commercial and educational policies. In this final section, I refer to different models of research each of which is necessary and each of which has different implications for resources and implementation. The models should include:

- quantitative and qualitative studies which provide base line data (where this is not already available)
- monitoring data and illuminative evidence of relationships and trends in gender and attainment
- comparative studies both within and out with the UK
- observational studies which provide details of practice
- longitudinal studies of individuals and cohorts of young people through their educational careers
- studies that test or contribute to theories of gender and attainment.

Studies of gender differences must take account of the macro-social conditions: the economic, technological and political situation. There is a need for more comparative studies with shared research design and shared research questions. What has proved quite difficult in this review and in others concerned with attainment is to compare and integrate results. Definitions of terms are different and even incompatible and educational systems and contexts of assessment make simple comparison meaningless. There are common problems and we could benefit by sharing solutions. Studies should at least look at gender and achievement across the UK and perhaps the European community. Cross national comparisons could also compare the intention and performance of government in gender issues.

Gaps between intention and practice are a feature of human life and teaching/learning situations have their share of reality falling short of the ideal. We need detailed observational studies of current practices in schools and other educational institutions. Such studies may be best effected in collaboration with teachers and lecturers as part of their professional development and where shared ownership reduces the threatening overtones of having an outsider scrutinise your work.

Stromquist suggests that research includes longitudinal studies which trace the evolution of policies or practices that are gender sensitive to understand how equity objectives can be accelerated by legislative means whether coercive and promotional. An example of the potential usefulness of longitudinal studies is in the recent work by Elwood (1995) who showed that girls' average superior performance throughout different levels of education is reversed in examination performance at age 18. To understand this phenomenon, it is necessary to track individual pupils through their educational career to unpack the changing pattern of performance in examinations between males and females. It is recognised that longitudinal studies are difficult and expensive particularly in relation to those of the original sample are lost in the course of the study.

Research is not a-theoretical although many studies may not make explicit the underpinning assumptions. Research studies should permit the development and testing

of theories of gender differentiation and attainment in education and shed light on the possible strategies that might be used to overcome inequalities. One version of the development of dominant gender theories can be set out as follows:

Development of dominant gender theories

- equal opportunity
- equal access and resources
- girls' agenda different but equal to boys
- importance of school effects on achievement and emphasis on outcomes
- distinction between equity and justice
- current policies which emphasise and endorse individual responsibility rather than that of society

Other theoretical explanations may be termed functionalist, Marxist reproduction theories, and feminist approaches of various kinds which address political, critical or praxis dimensions. The situation may be as Apple (1989) suggests: under achievement is again the responsibility of the individual rather than the educational institution, society or government. However Sheila Riddell and Sally Brown (1992) are forthright in putting responsibility for action on equality not just with parents and teachers but also education authorities and SOED (Now SOEID):

> Central government however remains at best non-committal and has yet to recognise the strong case for research in Scotland on class, ethnicity and gender which takes account of its unique cultural, social, political and economic context.
>
> (p4)

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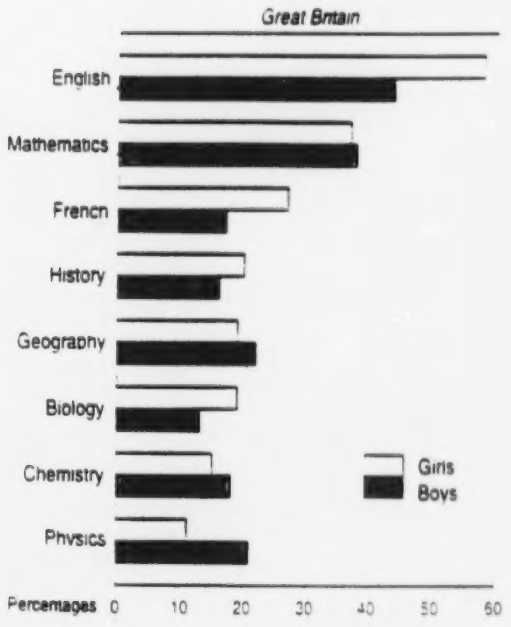
APPENDIX

Charts and Tables

CHART A

School leavers with grades A - C at GCSE[1]: by subject and sex. 1990/91

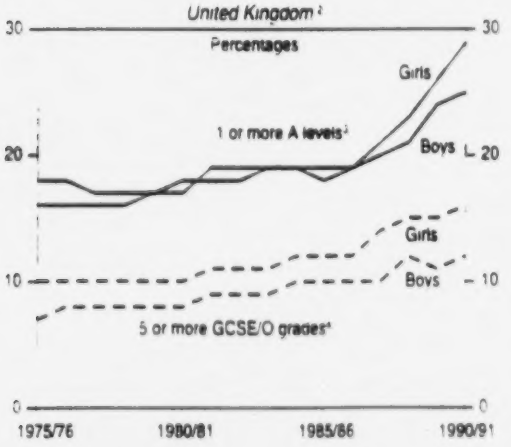


1 Includes GCSE/GCE O Level/SCE grades A-C and CSE grade 1

Source: Department for Education; Welsh Office; The Scottish Office Education Department

CHART B

Highest qualification[1] attained by school leavers: by sex



1 See Appendix Part 3 Educational attainment
2 Great Britain only for 1980/81 1982/83 and 1984/85
3 Or 1 or more H grades
4 Includes GCSE/O grades A-C and CSE grade 1

Source: Department for Education; Welsh Office; The Scottish Office Education Department; Department of Education, Northern Ireland

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Table 1: S4 Standard Grade

Percentage of the presentation group who were female and Difference in Average Grade

	Percentage girls				Mean grade difference				Total
	1991	1992	1993	1994	1991	1992	1993	1994	pres 94
English	49%	49%	50%	49%	0.39	0.41	0.42	0.39	57765
English - Alt Comm				50%				-	4
English - Spoken				21%				-	19
French	61%	56%	54%	52%	0.20	0.47	0.52	0.57	39448
French Writing	63%	60%	59%	60%	0.11	0.13	0.16	0.17	20877
Gàidhlig	50%	39%	56%	57%	-	0.56	0.73	0.78	86
Gaelic	56%	53%	48%	54%	-	0.74	-	-	378
Gaelic Writing	70%	70%	53%	68%	0.27	0.46	0.27	0.19	161
German	61%	58%	57%	52%	0.30	0.47	0.58	0.62	13932
German Writing	63%	62%	61%	59%	0.14	0.22	0.22	0.28	8389
Greek	38%	33%	73%	44%	-	-	-	-	9
Italian	75%	74%	76%	74%	0.50	-	-	0.79	292
Italian Writing	79%	74%	77%	76%	-0.54	-	-	-	221
Latin	56%	60%	59%	55%	-	-	-	0.13	1188
Russian	72%	64%	67%	49%	-	-	-	1.61	59
Russian Writing	77%	63%	73%	72%	-	-	-	-	29
Spanish	65%	62%	63%	60%	0.47	0.84	0.91	0.74	1704
Spanish Writing	68%	68%	68%	65%	0.35	0.21	0.38	0.27	1141
Accounting & Finance		54%	55%	55%	-	-	0.07	-	5326
Mathematics	49%	49%	49%	49%	-0.04	-0.02	0.03	0.07	58731
Biology	69%	70%	72%	71%	0.12	0.08	0.10	0.10	19936
Chemistry	47%	48%	49%	49%	-0.02	-0.01	0.02	0.05	22866
Physics	32%	31%	32%	31%	0.25	0.24	0.31	0.31	20733
Science	46%	44%	45%	44%	-	-0.08	-0.05	-	15372
Classical Studies	49%	45%	50%	46%	-	-	0.85	0.62	341
Contemp Soc Stud	44%	41%	43%	43%	0.08	-	-	0.15	1007
Economics	49%	45%	46%	44%	-	0.07	-	-	1930
Geography	41%	42%	42%	41%	0.20	0.29	0.34	0.33	22757
History	55%	55%	56%	56%	0.44	0.39	0.36	0.44	20599
Modern Studies	56%	56%	55%	55%	0.28	0.36	0.39	0.41	12826
Soc & Voc Skills	50%	52%	54%	53%	0.59	0.57	0.66	0.62	3169
Computing Studies	37%	36%	36%	35%	-0.06	0.10	0.14	0.15	17195
Craft & Design	14%	15%	16%	16%	0.21	0.25	0.28	0.35	11586
Graphic Commun	13%	18%	16%	20%	-	-	0.25	0.17	5620
Home Economics	73%	76%	78%	80%	0.87	0.88	0.85	0.91	8510
Office & Inf Studies	84%	83%	84%	84%	0.34	0.40	0.41	0.51	16462
Technological Studies	8%	8%	7%	8%	-	-	-	-	6059
Art & Design	53%	53%	54%	55%	0.54	0.50	0.50	0.47	18787
Drama	66%	66%	64%	63%	0.90	0.72	0.65	0.76	2626
Music	59%	62%	63%	65%	0.35	0.43	0.46	0.36	7335
Physical Education	31%	33%	32%	30%	-0.12	-0.18	-0.11	-0.12	13287
Religious Studies	55%	57%	58%	61%	-	-	-0.02	-	1049
All subjects	50%	50%	51%	50%	0.23	0.25	0.28	0.30	459811

Source: Source: Ganson and De Luca (1995) - Scottish Examination Board, Research Bulletin 3

Interpertative notes

The subject mean grades in the attached table are calculated by taking the average grade obtained by all candidates (or all female or all male candidates) who gained a grade between 1 and 7. Remember that because grades go from 1 (high) to 7 (low), the smaller the number, the better the mean grade. Similarly, the element mean grades include candidates who gained a grade between 1 and 7 in the element. The first row in each block gives the subject mean grades; the remaining two to four the element mean grades.

The column headed 'diff' is obtained by subtracting the mean grade obtained by girls from the mean grade obtained by boys. A positive figure means that the girls gained on average better grades in this element or subject, a negative figure that the boys did better. These figures should be interpreted with caution, particularly where gender difference in uptake may be associated with different ability profiles attempting a subject. They are also calculated using ordinal scales as though they were interval scales, ie assuming that the difference between grade 1 and grade 2 is the same as the difference between grade 6 and grade 7. Where there was no statistically significant differences in the grade distribution for boys and girls, the mean grade difference is not shown (but replaced by a dash). This would occur where the mean grade difference was very small or based on small numbers of candidates in one or both groups. A mean grade difference of 0 could arise if, for example, boys obtained an excess of high and low grades, whereas girls tended to obtain the middle grades.

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Table 2: ***Girls' mean grade difference compared with boys in the elements of Standard Grade Modern Languages 1995 (1996 figures in brackets)***

Modern Languages	Subject	Reading	Listening	Speaking	Writing
French	0.61	0.54	0.39	0.73	0.20
	(0.7)	(0.6)	(0.5)	(0.8)	(0.2)
German	0.61	0.62	0.48	0.68	0.29
	(0.7)	(0.7)	(0.5)	(0.8)	(0.3)
Italian	0.85	0.65	0.70	0.90	-
	(0.9)	(0.8)	(0.8)	(1.0)	0.5
Spanish	0.92	0.82	0.86	1.00	0.29
	(0.9)	(0.9)	(0.7)	(1.1)	(0.2)

Source: Ganson and De Luca (1995) - Scottish Examination Board

Table 3: ***Girls' grade performance relative to boys on internally assessed elements of technological subjects in Standard Grade in 1995 (1996 figures in brackets)***

Technological Subjects	Subject	Element 1	Element 2	Element 3
Computing Studies		Knowledge & Understanding	Problem Solving	*Practical Abilities
	0.25	0.12	0.16	0.41
	(0.3)	(0.2)	(0.2)	(0.4)
Craft & Design		Knowledge & Understanding	*Designing	*Practical Abilities
	0.38	0.06	0.69	0.37
	(0.4)	(0.1)	(0.7)	(0.4)
Graphic Communication		Knowledge & Interpretation	Drawing Abilities	*Illustration & Presentation
	-	-	0.07	0.46
	(0.1)	(-)	(0.1)	(0.5)
Home Economics		Knowledge & Understanding	Handling Information	*Practical & Org Skills
	0.86	0.67	0.84	0.98
	(0.9)	(0.7)	(0.8)	(0.9)
Office & Info Studies		Knowledge & Understanding	Keyboard Skills	*Handling Information
	0.48	0.34	0.63	0.45
	(0.6)	(0.5)	(0.7)	(0.5)
Technological Studies		Knowledge & Understanding	Technological Communication	*Problem Solving
	-	-	-	0.34
	(0.2)	(0.1)	(10.0)	(0.2)

Source: Ganson and De Luca (1995) - Scottish Examination Board
* These elements are internally assessed

Table 4: ***GCSE groups grades A-C 1988-90: performance of girls relative to boys***

	Differences (Female - Male) %		
	1988	1990	Mean diff 1988-1990
Biology	-7.7	-6.9	-7.3
Chemistry	-3.8	-2.5	-3.3
English	13.7	12.0	13.1
English Literature	11.7	12.4	13.1
French	5.2	6.3	5.6
Geography	6.1	7.0	6.2
History	5.7	6.1	5.8
Mathematics with cwk*	-4.0	-4.9	-4.5
Mathematics without cwk	-9.7	-5.3	-7.1
Physics	4.0	4.0	4.0

*coursework optional in GCSE mathematics until 1991
Source: Stobart et al (1992)

Table 5: ***Differences in the Percentages of Females and the Percentages of Males Obtaining Grades A-C in a Selection of GCSE Subjects (1988-92, Northern Ireland Schools Examinations and Assessment Council)***

	Female% - Male%				
	1988	1989	1990	1991	1992
English	13.5	15.5	13.0	13.3	16.9
Maths (with c-work)[1]	-18.8	-12.5	-16.3	-3.3	-3.2
Maths (no c-work)[1]	-8.1	-7.4	-5.3	-.-	-.-
Biology	-1.9	-6.3	-7.1	-5.1	-1.3
Chemistry	-4.3	-6.3	-2.2	2.7	2.7
Physics	14.6	13.3	13.8	15.6	11.2

[1] Coursework optional in GCSE mathematics until 1991

Source: Northern Ireland Schools Examinations and Assessment Council Statistical Booklet and quoted in D'Arcy (1994)

Table 6: ***S5 and S6 Higher Grade: percentage of the presentation group who were female and difference in average band***

	Percentage girls				Mean band difference				Total
	1993 S5	1993 S6	1994 S5	1994 S6	1993 S5	1993 S6	1994 S5	1994 S6	pres 94 S5+S6
English	57%	53%	58%	52%	0.17	0.10	0.14	0.13	30831
French	73%	74%	72%	74%	-	-	-	-	5454
Gaidhlig/Gaelic	68%	87%	75%	61%	-	-	-	-	131
German	76%	74%	76%	75%	0.16	-	-	-	2091
Greek/Latin	60%	60%	62%	62%	-	-	-	-	514
Hb/Nr/Prt/Sw	56%	89%	59%	55%	-	-	-	-	40
Italian	78%	79%	88%	84%	-	-	-	-	118
Russian	55%	90%	47%	60%	-	-	-	-	22
Spanish	73%	81%	78%	81%	-	-	-0.18	-	460
Accounting/Finance	51%	54%	52%	54%	-	-	-	-	3090
Mathematics	47%	43%	49%	44%	0.02	0.02	0.01	0.03	18802
APH Human Biology	73%	71%	83%	72%	-	-0.42	0.32	-	973
Biology	72%	68%	73%	68%	-0.16	0.18	-0.07	-0.22	11718
Chemistry	46%	51%	48%	49%	-0.10	-	-0.07	-	11653
Geology	67%	32%	100%	41%	-	-	-	-	36
Physics	30%	29%	31%	28%	0.21	0.08	0.15	0.13	12017
Classical Studies			72%	63%	-	-	-	-	364
Economic History	46%	56%	50%	57%	-	-	-	-	35
Economics	37%	46%	43%	47%	-	-	-	-	2572
Geography	44%	47%	45%	49%	0.26	0.26	0.21	0.25	7453
History	60%	62%	60%	61%	-0.06	-	-	-	7150
Modern Studies	60%	59%	61%	60%	-	-	-	0.19	6958
Ag/Eng/Hr/Nv	13%	27%	14%	25%	-	-	-	-	11
Computing Studies	23%	22%	23%	23%	-0.23	-	-	-	3420
Craft & Design	15%	24%	17%	27%	0.30	0.29	0.29	0.38	1918
Graphic Commun			15%	14%	-	-	-	-	791
Home Economics	94%	95%	96%	97%	0.42	-	-	-	403
Management & Info St	70%	63%	70%	62%	-	-	0.27	0.28	2584
Secretarial	93%	96%	94%	93%	0.29	-	0.24	-	4093
Technical Drawing	9%	10%	11%	13%	-0.44	-	-	-	644
Technological Studies	4%	5%	4%	5%	-	-	-	-	1139
Art & Design	61%	61%	62%	58%	0.25	0.39	0.31	0.40	6079
Drama	-	-	80%	76%	-	-	0.64	-0.09	419
Music	70%	61%	68%	61%	-	-	-	-	2112
Physical Education	-	-	30%	33%	-	-	-	-	1863
Religious Studies	77%	77%	76%	76%	-	-	-	-	852
All Subjects	53%	53%	54%	53%	0.05	0.06	0.08	0.12	148852

Abbreviations: Hb/Nr/Prt/Sw: Hebrew/Norwegian/Portuguese/Swedish
Ag/Eng/Hr/Nv: Agricultural Science/Engineering/Horticultural Science/Navigation

Source: Scottish Examination Board Research Bulletin 3 (1995)

Table 7: ***Percentages of attainment, gender and social class groups entering full-time post compulsory education***

Cohort*	S5				S6				FE			HE			YT			
	1	2	3	4	1	2	3	4	1	2	3	1	2	3	1	2	3	4
S4 Attainment																		
Low	8	13	19	22	2	5	9	13	7	12	16	1	5	10	56	59	57	53
Medium	39	40	43	48	14	16	16	22	17	19	23	7	10	19	43	48	46	39
High	85	86	89	91	54	55	64	72	10	9	8	49	62	74	11	12	11	7
Gender																		
Male	39	41	46	48	20	21	28	34	8	10	12	18	25	33	41	45	41	36
Female	46	49	56	60	24	26	32	39	15	17	19	18	28	37	34	35	34	29
Father's Social Class																		
Non-manual	69	68	74	76	41	42	49	55	13	14	12	36	48	58	22	23	22	17
Manual	33	35	38	41	15	16	19	25	11	13	17	10	15	20	43	47	46	43

*Cohorts 1-5 were first contacted in spring 1985, 1987, 1989 and 1991 and each followed up in the autumn two years later.

Source: Surridge and Raffe (1995) CES Briefing 1.

Table 8: ***School leavers by gender and highest SCE qualification: 1983-84 to 1993-94 (percentages)***

Gender and Academic year	Total leavers = 100%	Highest SCE qualification held							
			Standard Grades				Higher Grades		
		None(1)	4.7 (2)	1-3 (3) 1 or 2	1-3 (3) 3 or 4	1-3 (3) 5+	A - C 1 or 2	A - C 3 or 4	A - C 5+
Boys									
1983-84	45,951	28.9	8.4	16.3	8.8	7.9	9.5	9.4	10.8
1984-85	43,987	27.9	8.4	17.3	9.0	8.0	10.0	9.0	10.4
1985-86	42,595	26.2	10.4	17.1	8.9	8.3	10.0	8.7	10.4
1986-87	40,904	21.9	13.2	17.5	9.2	8.2	10.2	9.1	10.8
1987-88	38,919	16.9	15.6	17.9	9.2	8.5	11.5	9.2	11.3
1988-89	37,234	13.7	18.5	16.8	9.0	8.6	11.6	9.7	12.1
1989-90	35,126	12.2	21.8	15.5	8.2	7.9	11.0	10.6	12.7
1990-91	31,701	11.7	23.1	15.8	8.0	6.3	11.2	10.7	13.2
1991-92	30,776	11.2	20.5	16.2	8.1	7.1	11.9	10.9	14.1
1992-93	29,534	12.0	17.7	16.0	8.8	7.7	12.5	11.2	14.3
1993-94	29,708	9.9	17.0	16.3	9.1	8.7	12.4	10.5	16.2
Girls									
1983-84	43,786	23.3	9.0	15.1	9.6	7.0	13.7	11.8	10.6
1984-85	41,832	22.3	8.8	15.2	10.0	7.4	13.8	11.8	10.7
1985-86	40,481	21.2	10.0	15.0	10.0	7.6	13.9	11.4	10.8
1986-87	39,452	16.5	12.2	16.2	10.2	7.8	13.9	12.0	11.2
1987-88	37,140	12.9	13.6	16.0	9.7	8.0	15.0	12.8	12.0
1988-89	35,461	9.9	14.5	16.2	9.1	7.4	15.8	13.2	13.8
1989-90	32,771	8.9	15.6	16.2	9.2	6.9	15.2	13.5	14.6
1990-91	30,369	8.9	16.6	15.7	8.6	6.1	14.9	14.1	15.1
1991-92	29,820	8.7	14.2	14.9	8.5	6.6	16.0	14.6	16.6
1992-93	28,262	9.0	12.2	14.0	8.6	8.1	16.3	14.4	17.3
1993-94	28,486	7.7	11.5	13.5	8.8	9.2	16.0	13.2	20.0

(1) No SCE qualifications, or none found during matching process

(2) Including O Grades D-E/4-5

(3) Including O Grades A-C/1-3

Source: Scottish Office Statistical Bulletin Edn/E2/1995/14

Table 9: ***Average number of module enrolments per student registration by boys and girls at school in scotland***

Males	1991-92	2.0	Females	1991-92	3.0
	1992-93	3.0		1992-93	3.1
	1993-94	3.0		1993-94	3.2

Source: Scottish Office Statistical Bulletin (1995) Edn/F5/1995/18

Table 10: ***1993 leavers: number of SCOTVEC modules gained at school by sex (percentage of respondents)***

SCOTVEC Modules gained	Total	Boys	Girls
None	54	58	50
One	15	15	15
Two	10	9	11
Three	6	5	7
Four	5	4	5
Five or Six	6	5	6
Seven or more	5	4	6
Base (2)	4851	2506	2345

Source: Lynn(1995)

Table 11: ***Highest SCE qualification obtained by sex (percentage of respondents)***

Highest SCE qualification	Total	Boys	Girls
5+ Higher Grades	17	17	18
3-4 Higher Grades	13	11	14
1-2 Higher Grades	15	13	17
5+ Standard Grades 1-3	8	8	8
3-4 Standard Grades 1-3	9	9	9
1-2 Standard Grades 1-3	15	14	14
Standard Grades 4-7 only	15	17	13
None	9	10	7
Base (2)	4851	2506	2345

Source: Lynn (1995)

Table 12: ***School leavers' examination achievements: by sex and region 1990/91***

	1 or more A levels[2] (or SCE highers)		GCSEs[3] or SCE O/standard (no A levels or SCE highers)		No graded results		All leavers (= 100%) (thousands)	
	Males	Females	Males	Females	Males	Females	Males	Females
U.K.	25.5	28.6	65.3	64.9	9.2	6.5	338.2	322.8
England	24.6	26.6	67.2	67.5	8.2	5.8	277.3	264.6
Wales[5]	20.8	26.9	63.2	62.8	16.0	10.3	17.1	16.2
Scotland	35.1	44.1	53.2	47.0	11.7	8.9	31.7	30.4
N. Ireland	27.9	35.6	55.9	54.7	16.1	9.8	12.1	11.6

[1] Excludes results in further education

[2] Two AS levels are counted as equivalent to one A level

[3] And equivalent grades at GCE and CSE. Includes leavers with 1 AS level

[4] Some of these pupils will have achieved passes in other examinations, eg BTEC, RSA, Certificate of Education (in Wales) and SCOTVEC (in Scotland)

[5] Includes leavers from independent schools

Source: Department for Education; Welsh Office; The Scottish Office Education Department; Department of Education, Northern Ireland

Table 13: ***Percentage of boys and girls leaving school at different stages in 1993-94 in Scotland***

	S4	S5	S6
Boys	27%	32%	48%
Girls	20%	32%	41%

Source: Scottish Office (Statistical Bulletin Edn/E2/1995/14)

Table 14: ***School leavers by gender and highest SCE qualification: 1983-84 and 1993-94 (percentages rounded up)***

		Highest SCE Qualification Held			
		Standard Grades		Higher Grades	
		None	4-7(1)	1-3(2)	A-C
1983-84	Boys	29	8	33	30
	Girls	23	9	32	36
1993-94	Boys	10	17	34	39
	Girls	8	12	32	49

(1) including 0 Grades D-E/4-5
(2) including 0 Grades A-C/1-3
Derived from: Scottish Office (Statistical Bulletin Edn/E2/1995/14 Table 7)

Table 15: ***The 1993 Leavers Destination, by sex (percentage of respondents)***

Destination (May 1994)	Total	Boys	Girls
Full time education	43	41	45
Full time job	29	30	27
Training scheme	14	16	12
Weighted base	3469	1774	1695

Source: Lynn (1995)

Table 16: ***Responses about training received, by sex (percentage of respondents)***

	Total	Boys	Girls
On-the-job training			
Yes	81	84	78
No	17	14	20
Off-the-job training			
Yes	61	67	53
No	30	25	36
Recognised apprenticeship			
Yes	34	45	20
No	48	40	58

Source: Lynn (1995)

Table 17: ***Undergraduate entrants to Higher Education in Scotland: proportion of entrants who are female by sector and mode of study***

	Full-time entrants			Part-time entrants		
Year	Total	Higher Education Institutions	FE Colleges	Total	Higher Education Institutions	FE Colleges
1980-81	43.4	44.5	35.1	15.9	29.7	11.9
1981-82	44.4	45.2	38.7	17.1	28.8	13.0
1982-83	45.1	45.9	40.3	18.0	31.6	13.6
1983-84	45.6	46.0	43.4	22.4	38.4	17.1
1984-85	45.5	45.9	43.3	26.7	44.5	21.4
1985-86	46.4	46.7	44.6	28.4	44.7	23.5
1986-87	47.0	46.8	47.5	28.4	43.6	22.3
1987-88	48.1	48.5	46.7	31.3	42.9	27.4
1988-89	48.2	47.9	49.6	30.0	39.0	27.2
1989-90	49.2	49.2	49.5	33.4	42.4	30.5
1990-91	49.1	48.7	51.0	35.1	42.9	32.6
1991-92	49.0	48.8	49.6	36.1	44.3	33.5
1992-93	48.6	49.2	46.7	40.3	48.2	37.9
1993-94	48.3	49.0	46.9	43.3	53.9	40.0

Source: Scottish Office Edn/J2/1995/13

Table 18: ***Students in Higher Education in Scotland by gender and mode of study (percentages)***

	Full-time		Part-time	
Years	Male	Female	Male	Female
1983-84	55.4	44.6	76.2	23.8
1984-85	55.1	44.9	72.8	27.2
1985-86	55.1	44.9	70.8	29.2
1986-87	54.8	45.2	70.4	29.6
1987-88	54.2	45.8	67.4	32.6
1988-89	53.7	46.3	67.5	32.5
1989-90	52.5	47.5	65.0	35.0
1990-91	52.0	48.0	63.3	36.7
1991-92	52.2	47.8	62.4	37.6
1992-93	51.9	48.1	59.7	40.3
1993-94	51.9	48.1	58.2	41.8

Source: Scottish Office Edn/J2/1995/13

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